

THE RANGER

*Newsletter of the Defence Surveyors' Association
Spring 20000 edition*



Registered Charity No. 221816
Sponsored by ESRI (UK) Ltd.

Contents - Spring 2000

<i>Item</i>	<i>Page</i>
Editorial	2
Officers of the Association	2
Defence Surveyors' Association	3
Chairman's Column	4
Chairman's Report 1999	5
DSA prize winners 1998	7
Visit to HQ Royal Artillery Larkhill	9
The Defence Geographic and Imagery Intelligence Agency	10
HMS Scott	12
Phoenix in Kosovo	13
A printer's war	16
Over the horizon	19
A remarkable hat trick	20
50th anniversary of 135 Squadron	21
The TA today	22
Defence needs and the commercial response	24
The Apogee expeditions	28
UK Cruise Missile Support Activity	33
Business information for the surveying world	35
Ordnance Survey: Map makers of the past and the future	37
German sound ranging in the First World War: part 1	39
The total eclipse 1999	43
Obituary: Major General RCA Edge	45
Book reviews	46
Treasurer's report	50

*Cover photograph: Phoenix in Kosovo 1999. Another successful mission is launched during Operation Agricola. Article on page 13.
Photograph: QMSJ K Andrews RLC*

THIS EDITION OF RANGER.....

A new millennium and a new editor for the Ranger! I have taken over from Jim Smith with the daunting task of trying to match the high quality of the work of a man whose recently published book on Everest is reviewed in this newsletter. I come from a Military Survey background but have been in business for the last seven years and so hope that my style will not be too much akin to SOPs.

The newsletter has come a long way in a short time demonstrating the Council's aim to maintain the constant improvement in quality whilst, at the same time, broadening the scope to reflect equally the happenings in Defence Survey "yesterday, today and tomorrow". With that in mind, the intention is to include articles from Defence Geographic-related industry and academia as well as input from the Royal Navy, the Gunners and Sappers and, of course, details of Association business.

The lead article in this edition describes another new start, the merging of Military Survey and JARIC to form a new agency, The Defence Geographic and Imagery Intelligence Agency. Whilst the forming of the new agency is no doubt laudable and necessary, it is sad to see the demise of the name, 'Military Survey', which will now only appear as part of the titles of the School at Hermitage and the new branch of the Royal Engineers Association.

New starts are also the flavour of Paula Good's article on the Ordnance Survey's changes in status and business approach and Roy Wood's feature on life after Defence Survey. The several glimpses to the future are balanced by Morton Bissett's story of a printer's war and Peter Chasseaud's fascinating investigation into the strange failure of German sound ranging in The Great War.

I apologise for using the Telegraph's obituary of Major General 'Joe' Edge but the impending publication deadline did not permit the commissioning of a more comprehensive account of his very full life.

The RSM of 42 Group's account of a number of recent mountaineering and exploration expeditions shows that today's high-tech soldiers share a common bond with the late 'Joe' Edge and come from the same stock as their predecessors who marked the 49th Parallel or delineated the boundaries of Empire. When considered with HMS Scott's recent record-breaking voyage and the very successful deployment of Phoenix to the Balkans, it would seem that Defence Survey is in good hands!

Finally, as always there is a plea for articles from members, whether their own efforts or something that they have seen elsewhere and feel would interest readers. Good illustrations are particularly needed, as a picture is indeed, worth a thousand words.

Alan Gordon

OFFICERS OF THE ASSOCIATION

President:

Major General E W Barton CB, MBE
Aquarius
The Jesters, Rocky Lane
Haywards Heath

West Sussex RH16 4RQ
Tel: 01444 242 298

Chairman:

Lt Col M J Stanbridge FIMgt, ARICS,
MRIN
Rotherfield
13 Grange Road
St Cross
Winchester
Hampshire SO23 9RT
Tel: 01962 860 985

Hon Secretary:

David A Wallis HonRICS, FCIM
161 Cooden Drive
Bexhill-on-Sea
East Sussex TN39 3AQ
Tel: 01424 842 591

Hon Treasurer:

Major ROM Dobbie BSc
67 Fordbridge Road
Ashford
Middlesex TW15 2SS
Tel: 01784 252051

Editor of The Ranger:

Major AA Gordon FRGS, MIMgt
1 Majorca Avenue
Andover
Hampshire SP10 1JW
Tel: 01264 363392

Official Address:

Defence Surveyors' Association
c/o Royal School of Military Survey
Denison Barracks
Hermitage
Berkshire RG18 9TP

Registered Charity 221816

DEFENCE SURVEYORS' ASSOCIATION

Formerly the Field Survey Association

The DSA is a registered charity whose objectives are:

- To maintain a permanent liaison between officers serving in the Forces, retired officers and civilians working in the Defence domain who have an interest in Survey.
- To keep abreast of current survey issues.
- To recognise the most significant contributions to Survey by serving officers' through the award of annual prizes.

The Association publishes the RANGER newsletter and organises various social occasions and technical visits for members. These meetings provide an ideal opportunity to meet a wide range of people, all of whom have a connection with some aspect of Defence Survey.

The Council of the Association has plans for widening membership and improving its services to members. If you want to keep in touch with the survey profession and friends in the organisation come and join us.

The Articles of Association permit membership, subject to election by the Council, to all Officers and Warrant Officers who are engaged in Survey subjects and to suitably qualified civilians. In addition to these qualifications, a candidate for membership must also be known personally to at least two Members, who, as sponsors, must satisfy the Council that he or she is a fit and proper person to be granted the privileges of membership.

The cost of membership is a modest £10 per year payable by standing order on the 1st January. New members, joining while still serving, get free membership for the remainder of the year in which they join.

Those desirous of becoming Members should contact the Association at its registered address or telephone the Hon Treasurer on: 01784 252 051.

ANNUAL GENERAL MEETING 2000

The Association's AGM will be held in the Rotunda at the old Royal Artillery Barracks, Woolwich on Saturday the 24th of June at 1100 hours.

The meeting will be followed by the presentation of the Annual Prizes and the logo competition award.

After the presentations there will be a sherry reception followed by lunch in the Officers Mess.

WOULD YOU LIKE TO JOIN THE COUNCIL?

The DSA is looking for three additional members of Council, in order to add depth in the line of succession for the office of Chairman.

We are asking any member, who would like to join the DSA Council, to put their name forward for consideration by contacting David Wallis at:

161 Cooden Drive
Bexhill-on-Sea
East Sussex TN39 3AQ

CHAIRMAN'S COLUMN

This is my first article for Ranger which is well overdue as I will have completed my two year tenure as Chairman by the middle of this year. However, because we have not met our objective of publishing two editions per year this, fortunately, means that I have only missed one publication deadline. In this case, I have to say that I have only just met this one because I have been continuously badgered (nay, ordered!) to get my fingers to the keyboard by Alan Gordon, our new journalist, collator and editor.

During the course of my appointment, I have had the pleasure of only meeting those of you who have attended our quarterly events but, on average, the numbers attending only represent some 15% of the total membership and, I have to say, they are generally the same individuals. So come on the rest of you, you pay your tenner so come and get some value out of it. Notwithstanding that remark, it is appreciated that some sites may not be in striking distance but all events have been enjoyable and I encourage you to 'test the water'. The visits are often to sites that are normally closed to the public and the DSA always adds value in the form of subsidised lunches, briefings and conducted tours. This added value together with the 'long time no meet' social chitchat make the events really worth while.

I would like to draw your attention to the Membership paragraph in my 1999 Annual Report, which follows this article, and update you. To date, the Council has implemented three of the five recruiting steps I proposed and we are in the throes of completing the remaining two. However, there is a sixth 'Hidden Step' in the very last paragraph of the report and I would ask all members reading this to play their part in this regard.

The Ranger's wide distribution means that there are far more readers than members so, for those readers who are not yet members, I encourage you to join, swell our numbers and keep the 'Survey' network amongst the three services, MOD civilians, academia and defence industry alive. An Application Form is enclosed and the Association's rationale is detailed elsewhere in the newsletter. I look forward to meeting more of you at our next event.

Regards

Mike Stanbridge

WANTED: ARTICLES FOR THE RANGER

Good first-person articles from members always enhance the quality of the newsletter. By its very nature, Defence Survey takes people to remote places, often in times of crisis, or places officers at the heart of 'front-page' operations. The 'Yesterday' element of Ranger is made vibrant by such stories. The aim is to publish Ranger in both Spring and Autumn each year but to do this we need members to put pen to paper, or finger to keyboard, now in order to produce the Autumn 2000 edition.

Articles need not be long and technical, short humorous or poignant stories are also needed. Hand-written or typed copy is very acceptable and all illustrative materials will be returned immediately after scanning.

Chairman's Report for AGM 1999

Introduction

It doesn't seem possible that a year has passed us by since I took over the Chairmanship from David Wallis at the AGM in Portsmouth. I accepted the post with some trepidation because of my very busy full time business commitments and the consequential concerns about whether the Association would get the attention it deserves. Particularly, as I was following in the footsteps of David Wallis whom, I knew, would be a hard act to follow.

To some degree these concerns have proven true and although I may have introduced some new trains of thought and principles I have still had to rely on David, following his sideways move to Hon Sec, for his stead worthy support. For this, I thank him and may he continue to be my Man Friday for the next year of office.

Events

During the last year we have, unfortunately, only been able to arrange three meetings rather than the usual one per quarter. This was mainly due to our preferences, for the Q4/98 visit, being unavailable in the time frame required. But it was aggravated by the unforeseen, simultaneous absence of both David and I during the crucial planning period. However, the three events that were arranged, including today's, have I believe proved worthwhile and interesting. By coincidence, they have all had an aeronautical flavour. The Battle of Britain Ops Room at RAF Uxbridge, the AAC Museum at Middle Wallop and, now, the Naval Air Museum at Yeovilton. Whilst RAF Hendon is still on our list of 'things to do' we will endeavour to come down to earth or go to sea (or under it) for the next 2 or 3 meetings.

Forthcoming visits being planned for the remainder of the year and the early part of the Millennium include the Tower of London, the Submarine Museum, the Oceanographic Centre, RAF Hendon, the Imperial War Museum, Greenwich Observatory and the RM Museum. We will endeavour to give you good notice of these for inclusion in your diaries. Your Council is also endeavouring to arrange a black tie evening function if numbers make it worthwhile.

Finances

You will see that, following our increase in subscriptions, in Jan 98, our finances continue to remain reasonably healthy with liquid assets of about £3,900 with 45% of our reliable income

coming from subscriptions and the remainder from investments and interest. Our expenditure is reasonably predictable at 15% of the reliable revenue as running costs, 8% for subsidised events and 20% for the normal presentations. During the year Robert Dobbie, our Hon Sec, has done a meticulous review and progressively rectified all the standing orders and subscriptions to bring them into line with not only the new rate but with also conversions from LSD and guineas to decimalised currency. I know this has been a time consuming job for him and he has had to fit it in, like other Council Members, into a full time employment work schedule. He therefore also gets my thanks for undertaking this task on our behalf. Following my proposal and suggestions he is also now:

- a. Maintaining our accounts within the normal, Apr-Mar, financial year. Rather than Nov-Oct.
- b. Maintaining a rolling annual budget and subsequent 2 year plan so we can pre-empt any shortfalls and excesses in our income and expenditure.

The Ranger Publication

Two years ago, the Council set themselves an aim to change the image, contents and frequency of the Ranger publication but appreciated that this could only be achieved with dedicated resource and effort. Whilst we have been successful with the first two parts of the aim we have not been consistent with the last. Whilst Jim Smith has proved to be an excellent editor for collation, proof reading and publication purposes, he has been faced with considerable problems stemming from a lack of quantity, quality and timely input. In my opinion, this has been caused by the lack of, what I would call, a 'good investigative journalist' to search, obtain and/or write the story lines as well as seeking out sponsors and advertisers to offset publication costs. I have proposed to Council that we put this right during the next year by using the services of GordonWood Associates (namely Alan Gordon and Peter Wood) who are both members of the Association and have offered to take on the 'Reporter' responsibilities for the Ranger. I am confident that they will find us some interesting and varied articles without duplicating too many editorials from other trade or similar publications related to our own profession.

Membership

Now I come to my major concern regarding the future of the Association - our decreasing membership. Our numbers have now fallen to c.160 for a number of reasons. These include the lack of an active and continuous recruiting drive, social changes and the image the Association presents to the serving staff of the Defence geomatic agencies. The DSA has, I believe, become somewhat out of touch with the serving fraternity and, to some extent, have become an aging band of loyalists and we need to put this right. To this end the following steps are being taken to promote the interests and raise the visibility of the DSA with a view to not only increasing our membership but also injecting younger blood.

- a. Widen the circulation of the Ranger to serving officers, warrant officers and their civilian counterparts at Feltham, Hermitage, Tolworth, Guildford; Chicksands, Brampton, OWOB, Larkhill; Taunton and Plymouth. As a consequence the Ranger is not totally supported by sponsorship this year and the additional costs should really be charged to DSA publicity.
- b. The placing of DSA posters on Unit and Mess notice boards together with a suitable letter to the heads of establishments seeking their assistance and personal encouragement for membership.
- c. The careful selection of an individual at each site to act as the nominated on-site representative of the DSA for internal recruiting purposes.
- d. The visit by a member of Council to each site with a view to talking to and recruiting permanent staff and students. The first of these visits is to the RSMS in Oct 99 with an opportunity to talk to ASC students during Pt III of their course.
- e. The sponsorship of a Dinner night at 42 Svy Engr Gp in Nov 99 which will be attended by up to 6 Council Members on a self paying basis.

It is my view that the recruiting 'tap' should never be turned off and a trickle, at least, must always be kept running. Regardless of other recruiting activities that the Association may adopt, the best means of maintaining this trickle is via our own personal networks. So, for my last note of this report can I leave you with this thought.

'Recruit a member today for an Association tomorrow'

Thank you all for your continuing support

THE NEW LOGO COMPETITION

The Association's current logo dates back to the time when the Field Survey Association was founded in the early 1920s. It consists of a, then modern, vernier theodolite to represent the main survey practice of the time, with the titles of the three services bannered underneath.

Today, the membership covers a wide range of mapping and surveying activities that fall within the digital technologies which bind together all survey related disciplines under the banner of the Defence Geomatic Community. This, together with the Association's recent change of name, led the Council to decide it was time to update the logo with the possible new designs generated by a competition. We have received over ten entries, all of which have submitted designs for both the logo and letterhead. These will be judged by the committee at the end of February and the prize presented to the winner at the AGM to be held at the RA Rotunda, Woolwich, on the 24th of June 2000.

THE DEFENCE SURVEYORS' ASSOCIATION PRIZE WINNERS 1998

ROYAL NAVY

Lieutenant Commander JEl (Ian) Jolly, Royal Navy, won the Royal Navy prize for his contribution to the revision of hydrographic survey documentation. A competent surveyor with a deep theoretical knowledge he has revitalised the post of Hydrographic Technical Author and has actively taken the lead in the introduction of Total Quality Management to the process of surveying.

Jolly also has been instrumental in ensuring the introduction of multi-beam technology to the Hydrographic Squadron has been undertaken in a measured and controlled manner. He has at the same time ensured that the future requirements for handling multi-beam survey and digital survey information have been highlighted within the United Kingdom Hydrographic Office.

He is an honest, hard working, conscientious person whose professional knowledge is much respected by his peer group within the Surveying Service. Not only has his contribution to the maintenance of survey standards in his present job been considerable but also his dedication to his profession has been evident throughout his career.

For his commitment and drive in ensuring present and future survey documentation meets the changing needs of the hydrographic surveyor Ian Jolly was justifiably awarded the 1998 Royal Navy DSA prize.

ROYAL ARTILLERY

Major Mark Lacey has been awarded the Royal Artillery Prize for his work in trialling new deployment methods for gun sound ranging.

Deployment of gun sound ranging bases has until now been a slow and unwieldy process. The requirement to deploy and then survey each microphone in the base meant that an average base of 7 microphones could take between 4-8 hours to deploy using conventional survey methods, dependent on the availability of accurate survey points close by. Whilst this timescale might be acceptable in a static defensive posture, it is not sufficiently responsive to support the more mobile operations envisaged in the future.

Major Lacey, as Battery Commander of 22 (Gibraltar 1779-1783) Locating Battery, initiated a trial in July 1997 to review novel deployment methods for gun sound ranging, to speed up deployment times without sacrificing accuracy. By mounting the microphones in Land Rover trailers, and providing a GPS-based survey system for each microphone, the Battery were able to considerably speed up deployment times for a sound ranging base line. Typically a 5-microphone base, achieving greater detection accuracy than a conventional 7-microphone base, was deployed and working within 30 minutes by day and 45 minutes by night. The trial initially used explosives to simulate artillery fire. There was no appreciable loss in accuracy from mounting the microphones in a trailer and using the PLGR GPS system for survey. In some cases detection of simulated guns was achieved in excess of the B Zone. The trial continued during the Regimental exercise, where in the space of 4 days a total of 14 bases were deployed in a variety of tactical situations. Finally the novel base was deployed during CRA 3 (UK) Division's Artillery concentration, Exercise IRON TORNADO, where the base successfully located the guns of the Divisional Artillery Group.

This novel approach to the deployment of gun sound ranging has given a new lease of life to equipment that has been declared obsolescent. The trial has proved that no appreciable loss of accuracy is incurred using a GPS system for survey, whilst mounting the microphones in trailers can improve the serviceability of the system dramatically. This work will also provide useful information to the Advanced Sound Ranging Project in developing a replacement for the existing equipment.



Mrs Lacey receives the Royal Artillery Award on behalf of her husband.

MILITARY SURVEY

Corporal Beard has been awarded the Military Survey prize for his outstanding support to 8 Map and Air Chart Depot, Military Survey's main depot for the management and distribution of stocked geographic products to meet Defence needs.

Corporal Beard joined the Depot in June 1997 as part of a small team responsible for the development and support of a new system that would control the complete Map Supply Process, i.e. the Geographic Product Supply System (GIPSY). This system comprised the latest technology and unfamiliar software.

His contribution to this task cannot be overstated. He developed a rapid understanding of the supply business and assisted external contractors in the logical definition of the business needs. As each element of the development progressed he was instrumental in thoroughly checking its functionality to ensure that all aspects of the business were addressed. He identified a need for specific hardware that could link to the new system and, on his own initiative, researched and identified suitable printers, the installation of which allows the automatic output of completed labels that meet the Logistic supply chain criteria.

As the development progressed to the implementation of GIPSY and use of live data, he trained both military and civilian staff in its use and carefully monitored the progress of each process, developing and managing workarounds for inconsistencies, thus allowing the process to proceed until they could be corrected. His advice on the rate at which the ramp-up of GIPSY should proceed has been instrumental in preventing control failures.

Throughout the task his dedication has been exceptional and he has remained positive despite numerous frustrating faults with the underlying hardware. He has regularly worked long hours to ensure that progress was made. His exacting attention to detail has won praise from the contractors with whom he has been in daily contact and from all other staff, both military and civilian, with whom he has worked. He has consistently worked above the level expected of his rank and years of service.

Year 2000 considerations, the future need for precise resource accounting and stock control, management information returns and the need for product release controls, along with the need to maintain this unit's operational viability means that 8 MACD would not be able to operate efficiently without the functionalities of GIPSY. Corporal Beard had played a major role in its development and implementation, which without his dedication and sheer hard work, would not have reached the stage it is at today.



The President presents the Military Survey Award to Corporal Beard.

BOOK REVIEWS

Members knowing of newly published books that might be of interest to readers are asked to let the editor know the details so that a review can be published in *The Ranger*.

MEMBERS VISIT TO HQ ROYAL ARTILLERY, LARKHILL

34 members and guests attended a most interesting and memorable visit to the HQ Royal Artillery, Larkhill on Saturday 30th October. The visit was arranged by Colonel Paul Molyneaux, who is a member of the DSA, and organised by Lt.Col. Kevin Harvey who is also one of our members.

Our arrival was greeted by the sight of the gathering of the RA Hunt ready for the chase, which made a very colourful scene with the huntsmen in their traditional dress and the hounds running between the mounted riders. The ladies and our other guests were received in the Officers Mess by Col. Molyneaux to take morning coffee, while the members of Council had their meeting in another room.

Before taking lunch in the Mess, everyone gathered for a sherry reception where greetings and anecdotes were exchanged. The lunch was of exceptional quality and the table looked magnificent set with the regimental plate. The level of conversation increased in proportion to the flow of the wine, making it a most sociable occasion and difficult to keep to the timetable.

After lunch we transferred to a lecture hall in the HQ building where we were treated to a first rate talk by Major Mark Lacey (a DSA 1998 Prize-winner) on the new Phoenix battlefield system for locating and its first operational deployment (the subject of an article in this issue). There were many questions put to the speaker by the audience, which were well fielded by Mark. Such was the interest in the talk by Major Lacey that the time that had been allocated for a short film that is used as an aid to recruitment had to be abandoned.

After the talk on Phoenix we were treated to a hands-on look at a selection of the Gunner's newest "Kit" and firepower. Unfortunately the afternoon had turned out to be rather unpleasant and rain started to fall quite heavily. However, the members braved the weather to go outside and were treated to an in-depth presentation of the equipment on display by the then, very wet but resolute, group of specialist troops. Their personal contribution to the day was greatly appreciated by us all.

The equipment on display was most impressive. It consisted of a complete Phoenix Battery, TAS10 gyro orientation instrument and Total Survey Stations, a Vickers AS90 155mm Mobile Gun and a MLRS Mobile Launcher.

Our President, Major General Eric Barton, thanked Col. Molyneaux, Lt. Col. Harvey, Major Lacey and all the RA personal who contributed to one of the best events that any of the members attending could recall. In fact the DSA has received a number of letters of appreciation, expressing their wishes that a similar event could be included in the DSA calendar in the not too distant future.

David Wallis



Members had the opportunity to see the MLRS whilst the RA Sergeant described the system.

THE DEFENCE GEOGRAPHIC AND IMAGERY INTELLIGENCE AGENCY (DGIA)

by Major JD Kedar RE

Military Survey and the Joint Air Reconnaissance Intelligence Centre are converging to form a single new Defence Agency, the Defence Geographic and Imagery Intelligence Agency (DGIA).

The decision followed a series of studies and consultation, partly conducted within the Strategic Defence Review, which concluded that there were a number of medium to long term drivers which would allow a single agency to improve operational effectiveness. The DGIA is launched on 1 April 2000.

This short article will show how the Agency will be organised, with emphasis on the survey elements of the DGIA.

ROLE

The DGIA will provide imagery intelligence and geographic support to defence policy, planning, operations and training.

To do this it will:

- provide highest quality geographic and imagery intelligence support capabilities within resources, able to meet the future UK Defence demands for all types of operations and training in a digitised battlespace environment.
- meet UK Defence customer requirements through the generation of timely, innovative and effective products which deliver maximum value for money and permit sustained investment in new enabling technologies.
- bring in and bring on the skills of the Agency's staff to retain a motivated, flexible workforce able to exploit information and new technology efficiently.

ORGANISATION

The Defence Geographic and Imagery Intelligence Agency will comprise a headquarters, located at Feltham and three individual units: JARIC, 42 Survey Engineer Group and the Defence Geographic Centre (DGC).

The Joint Air Reconnaissance Intelligence Centre (JARIC) provides the DGIA's imagery intelligence output, is located within RAF Brampton and comprises approximately 500 staff, the largest component of which are RAF personnel. Within JARIC, Production Squadron provides survey support.

42 Survey Engineer Group provides the DGIA's geographic support in the field, with which readers will be familiar. The main site is at Hermitage with 14 Independent Topographic Squadron in Monchengladbach, Germany and 135 Independent Topographic Squadron (Volunteers) at Ewell, South London. The Group includes the Royal School of Military Survey (RSMS), which is also located at Hermitage. 42 Svy Engr Gp comprises some 525 personnel, the majority of which are Army.

The Defence Geographic Centre, which comprises the acquisition, production, dissemination and management aspects of the DGIA geographic information output, will be located at four sites. Feltham will be the major site, with Tolworth (which houses the MOD Map Library), Main Building (Geographic Support Main Building) and Guildford (8 Map and Chart Depot (8MACD) being subsidiary sites. 8 MACD will redeploy to Feltham this summer. The Defence Geographic Centre comprises over 700 personnel, the vast majority of which are Civil Service.

This organisation retains the identity of the three main parts of the Agency, although the term Military Survey will only remain in the title of the School, the Royal School of Military Survey.

CHIEF EXECUTIVE

Brigadier Peter Walker has been appointed the first Chief Executive of the DGIA, a post that can be filled by either the RAF or the Army.

Brigadier Walker joined the Army in 1968, graduating from the Royal Military Academy Sandhurst in 1970 to join the Corps of Royal Engineers. He has had a variety of responsibilities in the Corps, ranging from combat and amphibious engineering to construction projects and surveying tasks. These duties have taken him to a large number of countries, including most western European nations, the USA, the Caribbean, parts of South America, St Helena, Ascension Island, Cyprus, Hong Kong, East Africa and on operations to Northern Ireland and former Yugoslavia. He has commanded 14 Independent Topographic Squadron and 42 Survey Engineer Group.



Brigadier Peter Walker

Brigadier Walker has a degree in civil engineering, attended the Army Staff Course, and has completed the Army Survey Course. He was appointed as an Officer of the Order of the British Empire in 1990, is a Chartered Surveyor and a Fellow of both the Institute of Management and the Royal Geographical Society.

Logo

Following a competition within Military Survey and JARIC, Mr Ron Shepcar's design (below) has been selected for the Agency.

DGIA

It is simple, striking, dynamic and memorable and mirrors the growing trend within MOD for such designs. It is intended that the design be registered, as it will appear on Agency products.

TO CONCLUDE

Accurate and timely information is becoming more important on the battlefield, in the air and at sea. The DGIA is charged with providing the geographic and imagery intelligence components of this information. Mapping, both in paper and digital form, supplied by the Agency and the geographic field support it provides is in increasing demand as recent operations in Bosnia, Kosovo, the Gulf and in many other parts of the World have demonstrated. The DGIA will continue to evolve to best meet Defence requirements.

MILITARY SURVEY BRANCH OF THE ROYAL ENGINEERS ASSOCIATION

The Military Survey Branch of the Royal Engineers Association mentioned in the last edition of *The Ranger* has now been formed and recruiting is going well with the first reunion planned for Saturday the 26th of August at Denison Barracks, Hermitage.

The Branch aims to act as a focus for all current and former members of Military Survey whether military or civilian, technical or support staff. It is in no way in competition with the DSA but intends to compliment it and mutually support Military Surveyors, past and present.

One of the aims of the branch is to build up a database of member's career details so that information, for example, a list of those members who attended a particular Army Survey Course or those who served in a specific squadron at a nominated period of time, can be generated. This database is now being populated as membership applications are returned and is already generating considerable interest from former surveyors, surprisingly particularly ex-national servicemen, seeking old comrades.

Anyone wishing for more information should contact the editor.

HMS SCOTT

by Commander Trevor Horne RN

HMS SCOTT, the Navy's newest and largest survey vessel returned to Devonport in October 1999 following a year-long survey deployment. During that time the ship, named after the famous Antarctic explorer, has surveyed an area equal to England, Scotland, Wales, Ireland, Denmark, Holland and Belgium. The Ship has been able to complete such a long period away, the longest peacetime deployment by the Royal Navy in over 30 years, by operating her unique three watch manning system. This system calls for only 42 of the Ship's 63 company to serve onboard when the 13,500 tonne vessel is at sea; the other third are on leave thus each person spends 75 days with the Ship before having 30 days off. This system allows SCOTT to spend 309 days a year at sea on task making her the most efficient survey vessel in the world today.

SCOTT began her deployment with a short visit to Swansea, her official affiliated city, receiving a warm welcome from the citizens of the Welsh City. After sailing, SCOTT undertook work off the south west coast in order to determine the extent of the UK's continental shelf before calling in at Gibraltar for a short stay and to rotate watches. Transiting through the Mediterranean and Suez Canal to the Indian Ocean, SCOTT began what was to become the largest and most efficient Indian Ocean surveys of all time with most of the objectives sought by the Hydrographic Office in Taunton achieved during the following six months. This previously sparsely surveyed area of the Indian Ocean provided an excellent opportunity for SCOTT to prove the capabilities of her deep water Swathe Array Sonar System (SASS), capable of surveying 180 km² per hour in depths of 4000m.

It is of note that the surfaces of Mars and Venus are better mapped than the deep ocean sea-beds of the earth. With SCOTT's surveying capability those sea-beds can be mapped faster and more accurately than was ever possible before".

During this period visits were made to Dubai, Muscat and the Seychelles and of course 2/3 of Ship's Company were away from home for Christmas as the Ship stayed at sea over the festive season. This always remains a difficult part of service life but SCOTT's Ship's company made the best of the situation in true naval tradition with a large number of activities organised. Carolers strolled through mess-decks on Christmas Eve collecting donations for the ship's charity. Christmas Day was celebrated with a foredeck BBQ and the youngest member of SCOTT Ship's Company being made Captain for the day. A Blankety Blank Night, a Ready Steady Cook Competition and the traditional Christmas Pantomime marked the following week. Fortunately there are also plenty of facilities onboard to work off the Christmas duff.

SCOTT can boast having two exercise rooms with a number of cardio-vascular workout machines, two mini-gyms and free weights as well as a small all-purpose gym used for such sports as badminton, 2-a-side volleyball and basketball.

By the spring, and following another Suez transit, Mediterranean passage and brief stay in Gibraltar for maintenance, SCOTT was at work in the Atlantic with visits to Madeira, Halifax and Vigo before returning to UK on the 4th of October.

The Ship will be in its base port of Devonport for six months undergoing maintenance and training before sailing in May, for another 12 month deployment back to the Indian Ocean initially and then the Atlantic.



PHOENIX IN KOSOVO

by Major GC Price RA, SO2 (W) UAV

Trials Major IGC Powrie RA, SO2 Fd Doc

On 31 May 99, 22 (Gibraltar) Battery equipped with Phoenix deployed on Op AGRICOLA. It was Phoenix's first operational deployment, resulting from a formal request from 4 Brigade to support its operations in Macedonia and Kosovo. However, it was agreed that Phoenix would be allocated to 4 Brigade, from the Brigade deployment into Kosovo and until 14 August 1999.

As the air campaign gathered momentum, the RAF also enquired into the possibility of deploying Phoenix in an airborne Forward Air Controller (FAC) role. The FACs were directing Harrier strikes from A10 aircraft flying at 10,000 feet using only binoculars to assist them. The RAF sought to exploit the Phoenix capabilities for the positive identification of targets by collocating a FAC with a BATES Ground Control Station (GCS). A joint Gunner/RAF trial was speedily set up on Salisbury Plain. The trial reconfirmed that Phoenix could differentiate between military trucks and the odd civilian tractor tangled up in the same convoy at any time of night or day. The trial also indicated Phoenix's ability to aid an FAC to assist a Harrier acquire a target if its Thermal Imaging and Laser Designation (TIALD) pod failed to do so and also to conduct a post attack assessments.

Concurrently with this trial, 22 Battery's recce party travelled to Macedonia, in order to verify that Phoenix could operate in theatre effectively. The recce party identified some significant challenges:

- It was quickly assessed that although the environmental conditions were close to Phoenix's design parameters, they were not insurmountable.
- Although some of the mountain peaks along the Macedonian/Kosovar border were higher than Phoenix's maximum operating altitude; the tact and diplomacy of the recce party enabled the ground control station to be sited in other nations areas.
- Finally, it confirmed what had been practised during the trials, there was a need for one GCS to launch and control an air vehicle (AV) on the southern, Macedonian, side of the mountain; then "hand the AV over" in mid flight to another GCS for operating over Kosovo;

and finally "hand it back" to a further GCS for the final stages of a flight and recovery in Macedonia.

22 Battery deployed as follows:

- One GCS and Ground Data Terminal (GDT) deployed onto the Ramno feature at an altitude of 1650m. This would take control of the AV and fly it into Kosovo. Once it had control, maximising the range of the system it would be possible to fly the AV approximately 20 km north of Pristina, however the south west corner of Kosovo could not be covered. A second GCS and GDT were deployed to the east of the APOD, grouped with the launch and recovery detachments, and was responsible for launching and recovering all the AV. The echelon was located further to the south in Svet Nicol.
- Battery Commander 22 Battery's Tac Group was co-located within HQ 4 Brigade where tasking was initiated and air space de-confliction carried out. During the air campaign an liaison party was also located in the Command Air Operations Centre (CAOC) at Vicenza, Italy.

Multi-national airspace de-confliction was an "interesting" exercise in this. A Phoenix mission from 4 Brigade to Kosovo and back had to be cleared through both the Italian and French areas to reach and cross the border. This co-ordination was executed by the CAOC at Vicenza; the Phoenix Liaison Officer there proved invaluable. Phoenix requirements were passed through the Allied Air Operations Centre (AAOC), a minimum of 24 hours in advance. For most of the flights launched from Macedonia, a standardised Restricted Operations Zone (ROZ) system was used. A ROZ with a diameter of 5 km was set up around the launch and recovery position. Once launched the AV climbed in the ROZ, to cross to the border and flew along a transit route, avoiding overflying villages; and a "hand-over" was initiated. Although Phoenix requirements were published on a daily basis in the Air Tasking/Air Co-ordination Order (ATO/ACO), there were several instances when unauthorised aircraft flew directly into the ROZ. Whilst there were no accidents, it highlighted the importance of vigilance and double-checking. This

multinational air co-ordination system worked well and was sufficiently flexible to allow the times for which a ROZ was required to be activated to be changed easily.

Although Phoenix was operationally brand new, its capabilities were soon learnt. CO 4 Regiment RA gave BC 22 Battery some clear orders, which included surveillance of VJ locations and route recce. The 24-hour capability of the system and its high-resolution thermal picture enabled the target list to be updated quickly and additional information passed onto HQ KFOR. The staff were quick to appreciate the effectiveness and flexibility of the Phoenix system. Later on, during the deployment into Kosovo, when low cloud bases prevented both the other Predator and Hunter UAVs from operating, Phoenix was the only equipment providing information.

As 4 Brigade prepared to move into Kosovo, the Battery was faced with the problem of deploying an advanced GCS to cover a new area of surveillance, while maintaining a flying capability over the former area of surveillance. Although only two complete troops had deployed, a reserve GCS and CDT were also available. By manning these reserve assets with a skeleton crew, a complete Troop was deployed forward with sufficient resources to conduct 20 flights while the remainder of the Battery continued operations.

Once in Kosovo, the mine threat restricted the ground forces off-road movement severely. Hence Phoenix was used extensively to monitor the initial Serbian withdrawals. Several bridges, although still standing, were clearly identified being avoided by the Serbian Army (VJ) armour. Phoenix also identified the systematic burning of villages as the VJ withdrew; as well as monitoring the return of the refugees. Phoenix provided a highly flexible 24-hour surveillance capability covering the majority of Kosovo until the routes had been cleared to allow access by ground forces. The mine threat also influenced 22 Battery's method of operation. AVs had to be built on hard standing and launched from temporarily closed roads. It demonstrated clearly the advantage of having a UAV system that is not reliant on prepared launch and recovery sites.

Once KFOR started the difficult process of bringing about a return to normality, Phoenix demonstrated that it was well suited to monitoring

urban areas and the exclusion zone, particularly where it could not be covered by ground forces. Indeed, Phoenix was the only asset that KFOR could task, since all the other UAVs were kept under individual national command and control.

Phoenix is a highly capable system that requires imagination and a full understanding of doctrine and tactics to maximise its full potential. Phoenix demonstrated that it should not be seen as simply another Surveillance and Target Acquisition asset, in Kosovo it took on a variety of unexpected roles and is able to support a broad spectrum of peace support tasks for which it was not specifically designed to do.

Op AGRICOLA showed an inherent weakness of the mission commander and his ability to



Phoenix is transported in all-weather, air tight containers. It is assembled by the soldiers and loaded by crane onto the "rail" where it is launched. Photographer: QMSI K Andrews RLC

understand the Commander's intent. The Phoenix detachments were well qualified to launch direct and recover the AV; however, they lacked the flexibility to use the system proactively to achieve the best results. This factor is now being examined; it may require considerable additional training or adjustment of personnel. The ability to react quickly and appropriately was enhanced by the introduction of a live picture link into HQ 4 Brigade. This enabled the tasking authority to observe the mission and reduced the need for the Image Analyst (IA) to describe verbally what was on the screen. In Kosovo, a fibre optic cable provided the live image from the GCS to HQ 4 Brigade; there is an operational requirement to provide greater separation and flexibility by investigating satellite or microwave/radio links. It is interesting to note that both Hunter and Predator provided live links into both HQ KFOR and the CAOC.

Both the pre-deployment and Op AGRICOLA demonstrated that the Phoenix system can be used in conjunction with Air assets. With the imminent arrival of Attack Helicopter force, such roles and procedures must be developed further as an operational priority.

Little or no guidance has been given on how to make the AV more survivable in a hostile Air Defence (AD) environment. It was assessed that some AVs were lost during the operation to hostile AD actions. On each occasion, the AV operator was unable to ascertain the type of attack. It is clear that any system that flies no faster than a helicopter is vulnerable to being shot down. This threat is now recognised and will be studied in greater detail.

This Op AGRICOLA deployment also identified the need to improve some of the Phoenix support vehicles' configurations, in particular, there is a need to improve their cross-country mobility and enhance their airportability.

The deployment of Phoenix to Kosovo demonstrated that it is an extremely credible and effective system. Inevitably with such new technology, there were some teething problems. It is reassuring to note that, throughout the deployment, when problems arose, in most cases, 22 Battery personnel were able to identify the fault and resolve the problem

themselves. The full package of lessons learned will be produced shortly. These are being merged with the recommendations from the troop trial that ran concurrently with Op AGRICOLA and will be able to inform other projects and thus ensure that Phoenix remains at the forefront of any force package required for a diverse range of future operations.



*Phoenix, with a flight duration of four hours, awaits its next mission, Kosovo August 1999.
Photographer: QMSI K Andrews RLC*

The Charles Close Society
for the study of Ordnance Survey Maps

The Charles Close Society aims to bring together all those with any interest in the maps, plans and related materials of the Ordnance Survey to promote the exchange of information and, to encourage and co-ordinate research.

To join or find out more about the society, contact the Membership Secretary.

Dr. Roger Hellyer, 60 Albany Road, Stratford Upon Avon,
Warwickshire, CV37 6PQ.

Telephone: 01789 295752

Society's website:

<http://ourworld.compuserve.com/homepages/pstubbs/ccshome.htm>

A PRINTER'S WAR

by Morton G Bissett

When war was declared in September 1939, I was a young assistant works manager with the London printing firm of Waterlow & Sons. For some months prior to this, the firm had been churning out as quickly as possible maps of Europe for the War Office, as the threat of war became imminent.

That month, I enlisted in the Army, and in view of my previous printing experience, was, after a short cadet course, posted as a printing officer to one of the Royal Engineers Field Survey units at Aldershot.

My unit was due to go to France, and when that country surrendered, to Norway, under General Auckinleck. Both countries having been overrun by the enemy, we were sent to Northern Ireland, where even in those days the IRA were active and a German invasion from Eire was a distinct possibility.

As a result of the experience in France, when all the Survey unit's large and static map printing equipment had to be abandoned in the retreat, it was decided that all the Field Survey Company's printing equipment should be reduced in size and made to fit into large mobile vehicles. The sides of these containers would be open when the machines were operating and folded when on the road. As these Leyland lorries were long, heavy and 14 feet high, they caused some problems on the UK roads - and subsequently in India as I found to my cost when one of my printing vehicles had its roof scalped by over-hanging rocks!

CLOAK AND DAGGER WORK

Unexpectedly in 1941, I was sent for by the War Office and mistakenly interviewed for a job as a saboteur in Shanghai! Having eventually convinced them that I had better things to do than this I was subsequently, and reluctantly, pulled out of 515 Company in Ireland and posted to the Inter Services Bureau (ISRB) whose HQ was in Baker Street, London.

Churchill had set up an organisation called the Special Operations Executive (SOE) to "set Europe ablaze" with sabotage, and the ISRB was the cover name for the organisation charged with this task under Brigadier Gubbins. They were responsible for recruiting and training agents of various nationalities, and the planning and running of the underground movements.

These agents were sent to different special training schools around the UK, where they were taught the use of German weapons, demolition, communications etc., finishing up with parachute jumping at Ringway.



*One of the mobile reproduction vehicles that replaced the equipment lost at Dunkirk. The sides expanded to provide sufficient space to operate the machines.
Photograph: MG Bissett*

I was posted to STS 38 in Essex where the Poles were being trained in a large country house, and I was given a Polish staff of three civilians, only one of whom spoke any English. They had evidently been forging Russian documents in Poland before the war. Now, despite the fact that the printing and ancillary equipment was very basic and in an underground cellar in the house, I was told to get on with the production of all sorts of forged documents for the various underground movements - very apt I thought. I had now become a backroom boy. I managed to recruit some British Army personnel and also an engraver from de la Rue's the stamp printers and a handwriting expert from Scotland Yard.

I was also able to obtain a proper printing machine from my previous RE contacts. With this staff, we were able to successfully forge most documents and, as a joke for a party, we even printed some £5 Bank of England notes with the Brigadier's head and signature substituted for that of the governor of the Bank of England.

The genuine original documents were smuggled out of the occupied countries by our agents and then passed to us for copying. Any imperfections on these documents had to be faithfully reproduced.

The documents would sometimes be printed on a special paper or board which in the former case, might need a watermark. As well as a printed background, a document might have a rubber or die stamp, invariably a perforated fiscal stamp, and always a photo, serial number and signature. The latter is why I had a handwriting expert. A UV lamp was used to 'age' a document when necessary and some documents might need to be wire-stitched or bound in a cover. There was the added difficulty of purchasing materials without arousing suspicion.

We received letters from the War Office and the Free French stating that our efforts were fairly successful, although I believe, that when the Americans came into the war and started in the forgery business, they were not so careful and lost some agents.



*Printing was a warm business in Ceylon.
Photograph: MG Bissett*

BACK TO RE SURVEY AND OVERSEAS

After 16 years with my special unit, I requested a return to an active RE Survey Unit, and was duly posted overseas. En route to India, I was temporarily attached to a large RE Printing Company in Egypt (512 Field Survey Company), who functioned in huge caves in the Desert at Tura, some miles outside Cairo, producing maps for the Eighth Army's advance in North Africa. Inside the caves it was pleasantly cool but outside the temperature was always well over 100°F.

At Dehra Dun in Northern India, I took over as OC of a mixed British/Indian Map Reproduction Unit which had mobile printing equipment in large trailers. Some genius at 14 Army Group HQ at Delhi decided to make life difficult for us by sending us to function 6500 feet up in the foothills of the Himalayas. The road up to Mussorie was so narrow and tortuous that a one way system operated on it between certain hours. It also had countless hairpin bends on it, with sheer two thousand-foot drops on one side and some jagged overhanging rocks on the other side in some places. Nevertheless, all my 14-ton trailer vehicles made it safely to the top of the mountain, only to find that the one flat piece of land for parking the large vehicles on was only the size of a couple of tennis courts, and a thousand feet below the town.

At this height, the rarefied air took a bit of getting used to and, as the monsoon season had not quite finished, rain leaked into the printing machine vehicles and made paper stretch a hazard in printing accurate maps.

When the rain eventually stopped, the views of the plains below us and of the distant snow-capped Himalayan mountains were superb. True to form however, on the actual day we had managed to get the darkrooms for our camera functioning and water laid on for them, GHQ Delhi decided in their wisdom to move us down to Harihar in southern India, 1500 miles away. Harihar was a small village in a desert some 150 miles from the nearest town, Bangalore. Altogether an uninviting place with nothing to commend it to my

men and so it was all work to provide a 24-hour service for maps that were immediately flown up to the Burma front.

At Harihar, we took delivery of some larger printing machines that had been sent out from the UK in huge five ton wooden packing cases attached to skids. These machines had to be assembled and erected by us before they could be used. Unfortunately, sea water had got into some of the packing cases on the voyage and so for some time it was not uncommon for parts of a printing machine to seize up on one of the night shifts, caused by rust that we had been unable to get at when assembling them.

SURVEY IN CEYLON

The addition of these larger printing machines more than doubled our total production and we were now called an Indian Base Map Reproduction Unit. However, it also meant that we now, with our mobile equipment, had 150 tons of stores to move, and move again we did, this time to Ceylon. While folks at home celebrated VE Day, we spent the day at the railway station loading our stores and heavy equipment under a scorching sun onto flat railway trucks. I have some vague recollection that nobody got much sleep on VE night as my unit was attacked by members of another Survey unit in a nearby camp. The "festivities" finished up with a furious water battle in which everybody was compelled to join in, and which ended at 2 am next morning!

The move this time was a popular one as, after the short sea crossing, we finished up in basha buildings made of cadjan, (i.e. dried palm fronds) in a delightful coconut grove at Karunagal, about twenty miles from Kandy, the capital of Ceylon. This was a pleasant change after being under canvas for a year, even if these walls were a haven for lizards and sometimes snakes. The chief pests were, however, white ants - they were everywhere.

Unfortunately, and not surprisingly to us, GHQ Delhi had failed to inform anybody in Ceylon that the gantry we used to erect our printing machines needed a fourteen foot minimum head clearance. Therefore, the roof of the building intended as our printing room had to be taken off and put back again after we had completed the installation of the machines. The powers that be were in such a hurry to get us operational that we had to drag the big wooden printing machine cases on their skids onto concrete that had not even had time to set hard.

The printing of maps of Malaya, Siam etc., now took priority as the Allies prepared for the final push. In the meantime, we all enjoyed the lush greenness of Ceylon and the friendliness of the people. The British personnel in my unit also at first enjoyed with gusto the free drink and snack they got from fallen coconuts but that taste soon wore off. Instead, they began to realise that there were hazards in working in a coconut grove from falling coconuts. These, coming down from palm

trees a 100-foot high could prove quite a menace and a sweepstake was run as to who would first be hit by one. The Sergeant Major and myself being joint favourites (only in this sense!) at odds of 8-1. In fact, as it transpired, the first victim was one of my unfortunate Sappers who had just rejoined the unit after being away for some time and was standing in the wrong place, at the wrong time. Fortunately, he was wearing a forage cap at the time and was only struck a glancing blow by the coconut but it knocked him out for a couple of minutes.



*71 Indian Base Map Reproduction Section IE had both British and Indian operators.
Photograph: MG Bissett*

But all good things come to an end and what goes up must come down so, we dismantled our machinery yet again, and set sail for Singapore after the Japanese had capitulated. There, we moved into a large factory owned previously by the Anglo-American Tobacco Company prior to occupation by the Japanese. Here we took over yet more printing machines, basically English, but with numerous Chinese parts fitted!

Singapore was quickly returning to normal again, despite the terrible ordeal so many of its citizens had suffered at Japanese hands. It was here that I spent my last Christmas with my unit before returning to England in January of 1946 for demobilisation and reunion with my family. My three years abroad had been quite eventful, too much so at times, and I was glad to be home again, even if the weather was diabolically cold that January and February.

OVER THE HORIZON

A Personal View by Lieutenant Colonel James Prain

As we enter the 21st century we face some exciting opportunities. Military Survey and JARIC are merging in order to more effectively exploit common technologies and to become more efficient through rationalising business processes. The new organisation will be known as the Defence Geographic and Imagery Intelligence Agency (DGIA) and is described in a separate article in this edition of *Ranger*. This comes at a time of great changes as both parts of the new Agency expand their digital processes and develop an increased range of digital products and information services. Our Defence customers are becoming increasingly sophisticated and are embarked on a major programme known as Battlespace Digitization. Within this, it is fully recognised that digital geographic information is a key component. In this article the author looks at some of the developments that are likely to affect the geographic information business in the coming years.

NEW CONCEPT FOR MAPPING

As Defence budget pressures and commercial business practices question all our activities we need to ensure we deliver to our customer what they need; this may not be what they initially request nor what we might care to provide. Our US colleagues at NIMA are facing similar resource difficulties, being expected to deliver more for less, and have developed a new concept for satisfying requirements for military essential geographic information on a global scale. The truth is that we can no longer afford to invest excessive time in cartographic enhancement nor can we afford to stockpile bulk mapping against possible contingencies. Our Cold War strategy for mapping support to 1st British Corps with its 60km frontage does not translate into the new era where highly mobile forces look globally as spelled out in the Strategic Defence Review. In the UK we are now investigating how we might adopt a similar concept to the US one.

The concept is known by the rather jargonistic title of the Geospatial Information Infrastructure and is based on developing and maintaining a database of vector mapping based on 1:250,000 scale sufficient to provide a skeleton for planning purposes. This complements digital terrain data, processed satellite imagery and any existing line maps that are available in raster form. Bulk map

stocks are only printed on demand. As an operation develops, these prepared data sets will be supplemented by richer data sets specifically tuned to weapon platform characteristics and location. Thus foundation data sets are supplemented by mission specific data sets.

A NEW MEANS OF PRODUCTION

In order to deliver these new data sets, a major investment programme is being led by the Defence Procurement Agency on behalf of Agency. The project is known as the Military Survey Digital Geographic Information System (MDS for short). This will provide the Feltham based Defence Geographic Centre with a new generation of workstations that will have improved capability, flexibility and productivity. There will also be close integration via the existing corporate IT network to the current stand-alone databases. Current expectation is that delivery of the MDS components will be staged over several years in the 2002 - 2004 timeframe.

A NEW WAY OF INTERFACING WITH OUR CUSTOMERS

As part of MDS there will be a family of computer servers providing digital products and generic geographic information. Customers will exploit the full range of web technologies to access this information 'on-line'. Thus as well as pushing data sets to our customer, they will be able to pull information they require, when they need it. Our increased electronic interaction with our customer will evolve over the coming years. We fully recognise that some of our customers will be more demanding of these new services than others; paper maps will still be provided!

LONG LIVE THE PAPER MAP

So what does the end user want? Whilst the demand for digital data will increase, this is in addition to a paper map as this is the ultimate insurance policy (a map still works with a bullet hole in it!). However the time will come when the end user can print off his own map sheet (or the portion of it he actually needs) locally and this will inevitably reduce the requirement for bulk map production undertaken at the baseplant.

SUPPORT IN THE FIELD

In the field there will be several areas of development. Our TACISYS vehicles will carry powerful imagery exploitation applications enabling a whole range of reconnaissance imagery, both optical and radar, to be imported and exploited for geographic purposes. The Geographic Support System (GSS), the successor to the old Print Train, will be enhanced making it better able to handle digital files, both digital products and digital reproduction material, as well as digital imagery from both satellite and tactical reconnaissance aircraft.

GPS AND GEODETIC SURVEYING

One area that may well diminish will be the need for military geodetic surveys. As more vehicles, weapon platforms and individuals are equipped with GPS receivers with absolute positioning to an accuracy of well under 10m, there will be less demand for the services of geodetic surveyors. The science of positioning, once the skill of the specialist, will be overtaken by technology.

However, what will not change is the lack of understanding most users have over the nitty gritty of grids and datums. The black box is only good when set up correctly and working correctly; there is still plenty of scope to get things wrong. Dead reckoning and basic map reading skills are still essential as is the advice of the expert surveyor.

SOUND PRINCIPLES REMAIN

So much for informed speculation, one truth remains; it is still the role of the military surveyor to identify topographic detail that is of military significance and to display this in an easily assimilated form. The principle guiding the gentleman surveyor of the past looking down into the valley to fix points of detail on his plane table is equally applicable to tomorrow's military engineer (terrain analysis) who is extracting key information from a vast collection of imagery and mapping sources. The task remains one of helping commanders understand the terrain in a timely manner through the appropriate use of extraction software and cartographic principles.

A REMARKABLE HAT TRICK

The following appeared in the Supplement to the December 1999 edition of the Royal Engineers Journal under Appointments:

APPOINTMENTS

Col Sir Idris Pearce CBE TD DL was elected Master of the Worshipful Company of Tylers and Bricklayers on 7 Oct 99.

Colonel & Alderman Clive Martin OBE TD JP DL was elected Lord Mayor of London on 13 Nov 99.

Maj Gen R Wood will succeed Maj Gen DA Grove OBE as Representative Colonel Commandant Corps of Royal Engineers from 1 Jan 00.

All three are either former Honorary Colonels of 135 Independent Topographic Squadron, Royal Engineers (Volunteers) or the present Honorary Colonel who is also the Lord Mayor of London. Colonel Idris Pearce 89-94, Major General Roy Wood 94-99 and Colonel Clive Martin since July 99.

All three are also members of 135 Officers Dining Club. The Club which has 30 members was established some ten years ago in order that retired officers can maintain the friendships they made when serving and also to render assistance to the squadron whenever needed.

As previously reported the Squadron celebrated its 50th Anniversary by receiving the Freedom of the Borough of Epsom and Ewell on 17th April 1999. A unique honour for a small unit. It is now well prepared to enter the next century.

Freddie Hore

Colonel WH Hore TD DL, Founder Member 135 Survey Engineering Regiment TA, Commanding Officer 1951-6 and Honorary Colonel 1978-84.

50TH ANNIVERSARY OF 135 INDEPENDENT TOPOGRAPHIC SQUADRON RE (V)

by Freddie Hore

Saturday 17th April was a very special day in the history of 135 Independent Topographic Squadron, Royal Engineers (Volunteers), when it received on behalf of the Corps of Royal Engineers the Freedom of the Borough of Epsom and Ewell. This prestigious honour was awarded in recognition of the contribution it has made to the community since its formation in 1949.

The occasion was the first time that the Freedom had been given to an organisation rather than an individual. The Freedom of the Borough was first granted in 1939 to the Charter Mayor and former Home Secretary, James Chuter-Ede, MP



The Mayor of Epsom and Ewell presents the illuminated scroll to the Chief Royal Engineer, General Sir John Stibbon KCB OBE.

The spectacular ceremony was attended by the Mayor of Epsom and Ewell, Councillor Paul Ardern-Jones, the Mayoress, Deputy Mayor and Deputy Mayoress, Aldermen and Councillors, the Chief Executive of Epsom and Ewell Council, David Smith, the Chief Royal Engineer, General Sir John Stibbon and Lady Stibbon, Mr Stuart Hibberdine, Master of the Worshipful Company of Chartered Surveyors along with other dignitaries and senior military personnel.

The Band of the Royal Engineers provided the music as it led the parade through the town before it came to a halt outside Sainsbury's in the High Street, Epsom.

A ceremonial scroll, which was produced for the occasion by two students of the Reigate School of Art and Design, was read aloud by the Chief Executive and then presented by the Mayor to the Chief Royal Engineer.

After the presentation the Squadron and a contingent from 42 Survey Engineer Group marched off with fixed bayonets to loud applause.

This was followed by a tour of the static displays at the Squadron Headquarters at Ewell and the unveiling of a commemorative plaque by the Chief Royal Engineer.

135 Officers Dining Club presented a display of memorabilia and silver. Included in the latter on temporary loan from Hermitage was the incredible piece of model engineering in silver of the Heidelberg Sord printing press. Members of the Defence Surveyors' Association will remember that it initiated this item and also made a contribution to its cost as something special to commemorate the 250th Anniversary of Military Survey in 1997. (See Ranger Newsletter Spring 1999 Edition cover and inside cover page).



The Squadron "presents arms" during the freedom ceremony in Epsom town centre.

Many members of the public witnessed the ceremonies at Epsom and Ewell. At 16.30 the Royal Engineers Band led a flag lowering ceremony.

In the evening there was a well attended cocktail party followed by an all-ranks party. This concluded perhaps the most memorable day in the unit's distinguished history.

The final celebratory event was for Past and Present members of 135 Independent Topographic Squadron RE(V) to attend a Dinner Night on Thursday 19 April at the Officers' Mess of 42 Survey Engineer Group at Hermitage. Some 80 members sat down to dinner.

Thus ended an eventful few months of celebrations starting with the 135 Officers Dining Club Banquet on 31st October 1998. (See DSA Newsletter Spring 1999 Edition pages 6-8). 135 has thus been duly launched for the next 50 years which it is hoped will be as successful as the first 50.

THE TA TODAY 135 INDEPENDENT TOPOGRAPHIC SQUADRON ROYAL ENGINEERS (VOLUNTEERS)

INTO THE NEW MILLENIUM by Captain AP Shell RE (V)

Most people that I speak to these days express surprise when I say that I'm in the TA - the public perception after last year's Strategic Defence Review rationalisation seems to be that the TA is closing down and no longer has a role to play.

Well nothing could be further from the truth!

135 Squadron is alive and kicking and emerged from the traumatic 1999 stronger than ever before. Yes, there were cuts in certain units (particularly Royal Engineers), however, 135's role as the only TA unit to support Military Survey ensured it's survival and we are looking forward to working more closely with the regular Army, both on exercise and in support of operations.

The TA has been restructured to take account of today's security concerns and move away from those roles which had greater importance during the Cold War, such as the large numbers required to guard against a major Warsaw Pact invasion of Western Europe. There is now greater emphasis on developing key trades and skills that are in short supply such as those required by Military Survey. These changes are necessary if greater use is to be made of the TA in more relevant roles.

This use is already being made. Did you know that the Reserves have provided 10% of British forces in Bosnia since 1995? 135 Squadron currently has a number of its soldiers serving with the Regular Army; Cpl Richardson is on Full Time Reserve Service with 28 Engineer Regiment in Germany, and Cpl Walsh and Cpl Dunn are on operational tours in Kosovo with 32 and 38 Engineer Regiments respectively. Over the last year 135 Squadron has also undertaken live task support with the Cyprus Sovereign Base Area Survey, bulk map stock movement at 8 Map and Air Chart Depot and a training area update at Pippingford Park. Finally, support has also been given when requested to Military Survey's operational squadrons out on exercise.

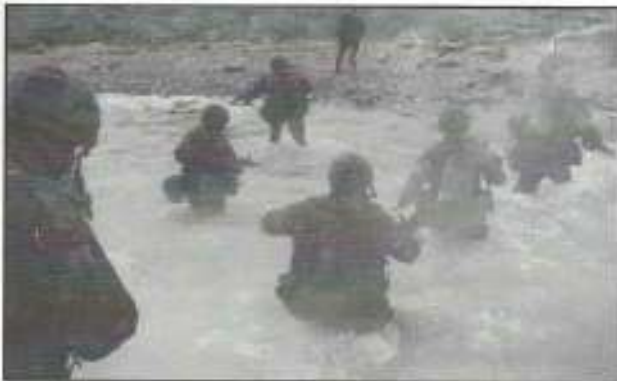
So what are we doing when not in direct support of the Regular Army? Well, in the minimum (and many do much more) 1 evening per week, 6 weekends per year and 2 week annual camp we undertake training for our role. The Squadron currently has 4 Troops; 339 Geo Troop which contains both reprographic and survey sections, 337 and 338 Map Supply Troops and 340 Support Troop. Over the last year training has included:

- Individual Training Directive tests - military training requirements essential for role. The tests cover shooting and weapons handling; first aid; nuclear, biological and chemical warfare; equipment recognition and the TA fitness test. Completion of these, combined with minimum attendance, qualifies the individual for a bounty of £1,050 and ensures that the Unit is fit for role.
- Trade Training - in close conjunction with the Royal School of Military Survey, soldiers are trained to be Military Engineers (Volunteers) Geo, specialising in either map supply, reprographic techniques or surveying - or all 3!



Mechanical handling of maps at a Forward Distribution Point.

- **Military Training** - this year the Squadron conducted Ex Clamerkin Canter on the Isle of Wight which all who participated enjoyed immensely. The exercise got off to a great start by initiating the soldiers into a beach landing, made particularly amusing by the dunking of the Sergeant Major! They then patrolled across the training area, encountering sporadic attacks by enemy forces and secured the objective using pretty well most of the Squadron's annual allocation of blank ammunition and pyrotechnics! Not a chance they get very often! They then went on to do training in Combat Engineer skills such as mine clearance, demolitions, and tree felling and route denial and topped the weekend off by practising helicopter drills during which most got a spectacular trip round the island.



Exercise Clamerkin Canter started with a dawn beach landing on the Isle of Wight.

- **Adventure/Leadership training** - in order to celebrate the Squadron's 50th Anniversary in a most memorable manner, Sgt Les Hunt organised Exercise Rocky Cockney, a fantastic 12-day trip to the Kananaskis National Park in Alberta, Canada for 13 lucky soldiers. The main part of the trip was a 5-day unsupported trek through the wilderness of the park followed by 4 days of water-based activities and visits to the Sulphur Mountain springs. The exercise was an undoubted success with many members of the team experiencing remote terrain for the first time. It is hoped that many of the younger soldiers will have become sufficiently enthused to become expedition leaders of the future.

- **Freedom of the Borough of Epsom and Ewell and the Squadron's 50th Anniversary** - Epsom town centre was brought to a standstill in mid-April 1999 when the Squadron was granted the freedom of Epsom and Ewell in honour of its 50-year presence in the community. The soldiers bravely paraded in the pouring rain whilst the freedom was granted to the Chief Royal Engineer and then marched back to the TA Centre from Ewell which was open to the public for the afternoon. The day's events were rounded off nicely by a 50th Anniversary birthday party where many beers were had by current and former Squadron members alike!

Much is asked of those who volunteer to serve with the TA. But there is much that the TA continues to offer, such as the sense of comradeship as well as the financial benefits such as pay and bounty. We are always looking for new volunteers aged between 17 and 32. No previous experience is necessary, but we are especially looking for Surveyors, Printers, IT specialists and people with a general interest in geography and cartography.

If you want further information please contact me or any member of the permanent staff at:

135 Independent Topographic Squadron RE (V)
 Mercator House
 Welbeck Close
 Ewell
 Surrey KT17 2BG

Telephone: 0208 393 0981/0982



Preparing map packs at a Forward Distribution Point trains the TA soldier for the operational role.

DEFENCE NEEDS AND THE COMMERCIAL REPOSE

by David Swann of ESRI Inc

Terrain is a critical factor in most defence decision making. The medium for supporting decisions has historically been the paper map but increasingly, command and control systems are being used to provide decision support tools. These systems must be able to properly exploit digital terrain data. The key question is who provides the expertise to ensure that terrain is correctly handled. The answer of course is the Defence Surveyor whether as uniformed serviceman / woman, Civil Servant or in industry. This paper provides the perspective of a retired Military Surveyor now working as Defence Market Manager for Environmental Systems Research Institute (ESRI) Inc in Redlands, California.

ESRI is recognized as the world leader in the expanding field of geographic information systems (GIS). Our business consists of the development, sale, and support of software ranging from desktop to enterprise GIS. ESRI provides a variety of consulting services, from user needs assessments to system design and development. ESRI's defence business is growing dramatically as defence organizations around the world take advantage of affordable, scalable and powerful spatial tools.

As many nations plan deployments of command and control systems, there is a concern that the defence community is ignoring the critical nature of terrain in these IT systems. Defence mapping organizations already face tremendous challenges in the need to produce digital geographic information (DGI) as well as paper maps... while continuing to see budgets cut. They can ill afford to take an in-depth interest in the way their DGI is exploited in defence systems. Unfortunately, it is rare to find anyone else inside the defence community qualified to understand the real issues involved in exploiting spatial data.

In the absence of qualified people inside defence organizations, the burden falls to consultants, developers and system integrators. Defence procurement staffs know that spatial data exploitation is important, that systems must be interoperable and that software should be reusable. They also fear vendor lock-in and want to establish control. The mechanism for doing this is all too often to get external consultants in to define defence standards for spatial data exploitation. These standards invariably take time to be created and staffed through the system. Then tools must be created that adhere to these standards and these tools must be properly supported and maintained.

It is becoming clear that this approach to creating spatial exploitation standards is fatally flawed. It takes too long to implement government tools based on government standards. It then costs too much to support and maintain these tools. The result is that defence sees expensive, outdated technology deployed to the warfighter.

The IT industry continues to develop at a rapid pace with product life cycles measured in months. Capabilities that were technically impossible 5 years ago are in commercial products today. All Commercial-off-the-shelf (COTS) GIS vendors have to track industry trends and react as fast as possible in order to satisfy our user expectations. All of us involved with the IT industry are faced with the same challenge of keeping pace with trends whilst addressing the challenges of interoperability and software reuse.

A major change that has occurred over the last few years is that interoperability, usability and software reuse have become characteristics of commercial software. Successful software products must have these properties for the same reason as car manufacturers. Ford, Honda or BMW cars can drive up to common fuel pumps, share overall layout and have similar ways of operating: because they wouldn't sell if they took unique fuel, had a bizarre layout or had tillers instead of steering wheels. Similarly, modern COTS GIS will not sell without data interoperability, logical process flows and standard graphic user interfaces (GUIs). Thus many of the problems that defence information systems organizations have struggled to solve with standards-based architectures have already been solved by industry.

Today's commercial-based IT architecture uses industry-standard technologies such as Java, COM (Microsoft's Component Object Model) and XML (Extended Mark-up Language). These technologies achieve the goals of reuse and interoperability of software. Tomorrow's architectures will inevitably involve new technologies, which COTS GIS vendors support as soon as they achieve the stability necessary to satisfy users' expectations.

The best way of delivering these up-to-date capabilities to the warfighter is to allow fair and open competition between COTS GIS vendors. It is appropriate to define the fuel that will drive these mapping capabilities: the data. Define the data model for the Defence enterprise and interoperability can be delivered on the very latest IT. Attempting to impose inappropriate standards results in the warfighter receiving last generation

technology as other nations utilizing fair and open competition deliver better capabilities to their warfighters.

While it is technically feasible to implement a common API set, the benefits of, and resources required to realize a common API set based on standards-mandated architecture are difficult to be supported by a business case. Defence standards organizations should look toward the IT vendor community for industry-standards to promote interoperability and reuse. The COM technology is a classic example of how industry is achieving that goal today.

In my 'life after Military Survey' I've come to recognize the incredibly valuable resource of the Defence Surveyor community. We have skills that are tremendously useful to defence system developers but that to date have been under utilized. I predict that in the months and years to come, procurement staffs, system integrators, consultants and vendors will properly recognize these skills.



Terrain visualisation on the screen.

RARE COLD WAR PERIOD FABRIC MAPS

GordonWood Associates have a few of the genuine silk-like fabric "Escape and Evasion" maps from the Cold War period remaining. The maps which date from the early 1950's are small scale and cover a large area around the title towns.

Send orders with cheques made payable to 'Gordonwood', to 1 Majorca Avenue, Andover, Hampshire. SP10 1JW

PRICE: £5 each plus 70p postage and packing. For orders of more than 4 sheets p & p is £3.00

SPECIAL OFFER; the entire set of 19 maps for £75 or a half set (any 8 maps) for £39 including p & p.

No	Front	Reverse	Remarks
FM1	France	Spain	Includes the south coast of England
FM2	Germany	France	Overprinted with the Occupation Zones
FM3	Brussels-Frankfurt	Milan	Covers most of western Europe
FM4	Amsterdam-Warsaw	Vilnius to Minsk	Covers most of northern Europe
FM5	Stalingrad	Stepnoy	An evocative name: Stalingrad!
FM6	Trieste/Budapest	Vienna/Krakow	Eastern Europe
FM7	Rome/Sarajevo	Tunis/Palermo	The Italian peninsula
FM8	Moscow	Ivanovo	The Russian heartland
FM12	Teheran	Bushire	Iran
FM13	The Aegean	Sofia	Greece and the east.
FM14	Beirut-Damascus	Al Jauf	The Middle East
FM15	Stockholm-Riga	Oslo-Stockholm	Scandinavia
FM16	Helsinki	Trondheim	Partner to sheet 15
FM17	Singapore	Penang	The Malay Peninsula
FM18	Bangkok	Saigon	Thailand and Vietnam
FM19	Rangoon	Mandalay	Burma
FM20	Hong Kong	Canton	Eastern China
FM21	Odessa	Kiev	USSR heartland
FM22	Budapest	Zitomar/Lublin	Central Europe



*Members had the opportunity to get inside the very impressive AS90 Gun for a briefing during the Association visit to Larkhill in October 1999.
Article page 9.*



*The general public enjoying the Open Day at 135 Squadron's Mercator Barracks following the granting of the Freedom of the Borough of Epsom and Ewell to the Corps of Royal Engineers.
Article page 21.*



*TA soldiers of 135 Squadron carrying out survey training to operate in a Nuclear, Chemical and Biological environment.
Article page 22.*



*The vast salt lake of Salor de la Maricunga in the Atacama Desert of Chile photographed by surveyors during Exercise Chile Apogee.
Article page 28.*

THE APOGEE EXPEDITIONS

RECENT MILITARY SURVEY MOUNTAINEERING AND EXPLORATION

by W01 (RSM) MG Jenkins RE

Military Surveyors of the Corps of Royal Engineers, by tradition and vocation, have always been closely associated with pioneering exploration in the world's remote and uncharted territories.

Since 1747, these resolute men have endured all manner of risks and conditions in their quest to gain valuable survey information. To this day the aim of military surveyors remains broadly the same:

"To explore, survey, and gather information with the intention of increasing geographic knowledge of the world's regions".

However, in recent years, although notable surveys have been carried out in various areas including Nepal, Kenya and the south Atlantic, opportunities for military surveyors have to operate in exotic and remote lands has declined as Defence needs have changed. As well as these surveys there has been scope for small numbers to participate in Joint Service expeditions to the Canadian Arctic and Greenland as well as British Schools Exploration Society ventures worldwide.

ADVENTURE TRAINING: THE APOGEE EXPEDITIONS

In the early 1990's two military surveyors, Mick Jenkins and John Braund, saw a long-term plan for adventurous training as the best way to provide some of that 'spirit of adventure' to the largely Cold War-oriented Military Survey. The plan was to mount major high profile mountaineering expeditions every two years up to the year 2000 which would be marked with a major millennium expedition.

Each expedition was to undertake a scientific aim linked to surveying and geographic exploration and thus exploiting the trained talent within the survey organisation. A major aim of such expeditions was to encourage future leaders in the promotion of adventure training in Military Survey and to see younger soldiers benefit from the rigours of such demanding ventures.

"Apogee" - *The highest or most distant point* - was chosen as the name for the expeditions.

ECUADOR 1993 - ANDEAN APOGEE

Following two years of research and planning, the first Military Survey mountaineering expedition set off in July 1993 to Ecuador, South America. Sponsored by ND Service Team, the aims of the expedition were twofold: to climb the two highest



The Joint Nation Team on Copalpo (6,100m) in the Andes in Chile during Exercise Chile Apogee.

peaks in Ecuador and to carry out GPS surveys of the mountain's summits. The main objective, Mount Chimborazo (6,310m), is the point on the earth's surface furthest from its centre (because of the equatorial bulge) and the highest peak in Ecuador. Once believed to be the highest peak in the world, it became the venue for European scientific observations in 1744 to ascertain its height and also to calculate the distance from the equator to the North Pole. These early scientific studies began a frustrating debate over the height of many Andean peaks, a situation that is still not resolved to this day.

Mount Cotopaxi (5897m), sometimes wrongly referred to as the highest active volcano in the world (see later in the text) and again a peak whose height was in dispute, was the team's second mountaineering aim. It was because of such disputes that the team decided to undertake GPS surveys of the mountains and determine the exact elevation of each peak. Led by Mick Jenkins and Peter Dinwiddie, the expedition became a joint nation venture when three Ecuadorian military surveyors joined the 10-man team.

The four week-long expedition was a huge success and, in addition to fulfilling all the aims, the team also managed to undertake valuable medical research at altitude for the Royal Army Medical Corps. On both occasions the climbing teams summited in horrific weather but were driven on by their will to complete the survey tasks. It was necessary for the survey team to remain on each summit for an uncomfortable 40 minutes to achieve accurate observations, a practice that required considerable survival instincts! Each ascent saw them as the only one of many foreign expeditions to summit because of the dire conditions.

Chimborazo was found to be 150 feet lower than it's official figure of 20,523 feet and the Ecuadorians, impressed by the GPS survey techniques used, have now accepted the new official figure of 6,267 metres. Stuart Fairmington, the survey advisor, and Paul Craft, the expedition interpreter, were the leading lights in achieving a successful exchange of working practices and survey techniques with the Ecuadorians. Importantly, further co-operation between both nations' surveyors has since occurred.

HIMALAYAS 1995 - INDIAN APOGEE

Mick Jenkins and Stuart Batey followed the South American success with a plan to undertake an ambitious Joint Survey with the Indian Military in the remote Zangar region of Northern India. Endorsed by the Joint Service Expedition Trust, the project was to be the first occasion since the "Great Trigonometrical Survey" that both nations surveyors would work alongside each other in an area steeped in survey history.

The initial response from the Indian authorities to the bold concept was very positive and much preparatory work was undertaken. However, two years of research and planning for the survey task was eventually to fall foul when, at the last moment, permission was withdrawn.

The mountaineering aim remained but now geographic exploration became the scientific focus alongside another medical project. The massive 21,000 ft peak of Kang Yissay, located in a very remote and harsh area of Ladakh, was the climbing objective.

Following the inevitable five-day administrative delay in Delhi, the 14-man team eventually met up with their Indian liaison officer and 6-man party of porters and cooks in the village of Leh. An arduous 7-day trek over the Himalayan divide via the Markha valley resulted in arriving at base camp well acclimatised. From here a small advance camp was speedily established at 17,550 ft and geographic recce parties departed to explore the enormous massif.

Hoping to make the first British ascent, Frank McCorrison, Glyn Hughes, Al Easingwood and John Leighton led the initial attempt to the summit. This, unfortunately, was thwarted by dangerously unconsolidated snow and ice. Avalanche threats were high and a distant avalanche made up the team's mind to retreat in deteriorating weather conditions. A smaller 6-man team made a second attempt two days later but were again forced to retreat in horrific conditions. It was these appalling conditions that led to a number of tragic deaths in the neighbouring Karakorum, including the famous British woman climber, Alison Hargreaves.

Although unsuccessful in it's climbing aim, the expedition was an accomplishment in the terms of its adventurous training and the valuable geographic and medical studies completed. The weather throughout the period had been notoriously bad, prompting bewilderment from the locals of such a phenomenon.



Surveying in the Atacama Desert

Throughout the expedition the team carried out geographic studies in a fashion similar to the pundit's of earlier times. Basic compass and distance work and an 'eye for the ground' enabled the team to update the poor large-scale maps of the area to aid future exploration.

EXERCISE CHILE APOGEE - SOUTH AMERICA 1997

Exercise CHILE APOGEE was a Joint Nation Military Survey mountaineering and surveying expedition to the Atacama Desert in Chile, South America. Led by Mick Jenkins and Frank McCorrison, the third Apogee expedition climbed, surveyed and explored a large region of the desert alongside Chilean surveyors. The end result was an ortho-rectified image map of the desert and the accomplishment of a heighting survey on an impressive desert volcano. The expedition itself was a serious adventure that very nearly didn't achieve anything...!! The following article was first published in the magazine of the Army Mountaineering Association.

SURVEY 250 EXPEDITION CAUGHT UP IN NATIONAL DISASTER

The drama and uncertainty of exploratory adventure caught us all by surprise when the effects of "El Nino" unleashed itself in terrifying fashion during our expedition to Chile. This meteorological phenomenon, which only occurs once every ten years or so, caused absolute chaos to the infrastructure of Chile during August last year and almost ruined our expedition before it really began!

Celebrating our 250th anniversary, Exercise CHILE APOGEE was a joint nation Military Survey mountaineering and surveying expedition to the remote Atacama Desert in northern Chile. Endorsed by the Joint Service Expedition Trust, the 13-man Royal Engineers team planned to climb and survey Mount Ojos Del Salado (6884m), the highest active volcano in the world.

The team, led by WO2 Mick Jenkins (14 Independent Topographic Squadron RE) was joined by freelance film cameraman John Miles, who was filming a documentary for the Discovery Channel, and by two surveyors from the Chilean Army equivalent of Military Survey. The broader aims of mountaineering, surveying and exploring in the Atacama Desert were all achieved but it was a very close call as we became stranded in the middle of Chile's worst national disaster for years! One of the major aims was to carry out an accurate survey of Ojos's summit to determine its height, which had been disputed for many years. A controversial claim by Argentina in 1994 stated that Pissis (6875m) was higher and therefore second in height to Aconcagua in the Western Hemisphere. They had demoted Ojos to 6864m based on a

satellite survey despite accurate theodolite readings by the famous American mountaineer, Adams Carter in 1956, who confirmed 6884m. Seems to be a tad of nationalistic bias to me!

Devastation

We began our 1300km journey from Santiago in Toyota vehicles during the very beginning of the deluge of torrential rain that hit Chile. It had been raining for some 60 hours and flooding was already evident as we drove north on what we expected to be a 14-hour journey to the town of Copiapo on the fringe of the desert proper. "El Nino" was of course to scupper our well-laid plans formulated over the last 18 months. We had gone no further than 150-Km north in driving rain when we were halted by the "carabineros" (local police) at a checkpoint. Victor, our resolute Chilean associate, informed us that a bridge had collapsed and it would be two days before it was fixed. Effectively, the whole nation was cut in two as Chile has only one main "artery" road that joins the whole country - we of course were frustratingly in the wrong half!

Not to be deterred, we spent the next 7 hours searching for a bypass to this obstacle and felt sure our trusty 4 x 4 vehicles would get us through. Wrong! - Our recess lead us to precarious mountain roads whose fragile bridges had been washed away and landslides had caused devastation countrywide. It became apparent that this was no ordinary storm and that we would be hard pushed to travel the next 1150km if the damage was really countrywide! We slept and pondered our frustrating position alongside



Devastation on the route to the expedition area, Chile 1997.

hundreds of other vehicles that were in the same "flooded" boat as ours. The police, convinced of our international film status, allowed us to view the dilapidated bridge that was now witnessing a temporary repair using a good old "Bailey" bridge. Only one problem, the last of the decking had not arrived and was not due until ten that

night. The expedition leader and his deputy, WO1 Craig Burns (competent bridgebuilder!), thrust themselves into negotiations with the site manager in the hope that they would allow us (as expert engineers!) to complete a makeshift finish to get our trucks over. Not a chance of course as the legal connotations of our actions ensured a swift denial!

We continued on our journey in the early hours next day joyous that we might just make it to the desert. The journey did not prove to be that simple and it was to play with our emotions for the next 48 hours. Our next obstacle was the sight of a tragic disaster where a bridge had been washed away, taking with it a lorry and their passengers who unfortunately died in the incident. We were again held at a checkpoint where we diligently convinced the authorities to allow us through. The rain and floods had by now subsided and we were able to negotiate a path through the flooding river to continue our journey - others had tried but failed and were now bogged in the banks of the swelling river. We eventually reached Copiapo three days after leaving Santiago having witnessed complete devastation. Roads were simply washed away, railroads destroyed and landslides had caused destruction everywhere. The Red Cross and Army were prominent throughout our journey assisting a stranded public. Some were trapped on the high mountain passes and some areas had seen more rainfall in the last three days than had fallen in 10 years. We were only one of a handful of 4x4 parties that had made it to the north, the rest of the population had to wait a further three days before temporary repairs were effected.

Desert and Volcanoes

Already three days behind a very tight schedule, we drove from sea level to 3400m, passing through the stunning panoramas of the world's driest desert. The extreme altitude took its toll and we were forced to do everything at a very slow pace because of the debilitating thin air. We were now within striking distance of the Argentine border but still some 100km short of Ojos. The very low snow line caused us concern and it was evident that "El Nino" had deposited vast dumps of snow on the Andes chain. Our Military Survey forefathers had previously visited this remote and inhospitable area in 1902. They had undertaken the massive task of delineating the Chile / Argentine border that had been, and still is, disputed. Under an International remit Major Hills RE carried out the topographic survey work in this, the remotest part of the Andes chain.

We immediately set about our own survey tasks as a means of acclimatisation. Our aim was to carry out geodetic GPS schemes to allow us to produce a rectified image map of the area using SPOT imagery. Cpl John Leighton and the two Chileans, Victor and Orlando, supervised the survey work which allowed us to establish an exchange of working practices and techniques with the Chileans. The small teams travelled far and wide across the desert whilst the leaders explored avenues of approach to Ojos only to be faced with 4/5 metre snowdrifts. Despite exploring every possibility, with vehicles constantly being "bogged" in the snow, it became obvious that the team would not reach Ojos. Throughout all this time, LCpl Dave Mothershaw (Digital Dave!) had been transmitting real time images and text onto our website. Our Expedition sponsors, ND Service Team of Newbury, designed the internet site and acquired a British telecom "Mobiq" satellite phone which allowed our viewers and supporters to monitor our progress daily throughout.

The survey and exploration was soon followed up by acclimatisation climbs on the nearby mountains and the team climbed three volcanoes in superb winter surroundings. It was a privilege to be climbing in one of the remotest of mountain terrains with no one else in hundreds of miles and right on the Argentine border! The mid winter of the southern hemisphere, coupled with the extraordinary weather of the time, caused us to change our major objective to the famous high altitude volcano of Copiapo peak (6,100m) some 50 Km away from our base at Salar de la Maricunga. This mountain was famed for its Inca remains and history of human sacrifices at its base. An exciting and nerve wracking battle against the harsh terrain saw us drive to within 15km of the summit and the initial view was one of enormity as we realised that this would be no easy ascent! "It is a magnificent mountain draped in its full winter coat giving a sense of apprehension"

Summit Fever

We only had five days in which to climb and survey the height of the peak and it was obvious that we would have to establish a number of camps on the hill from our base at 3800m. The mountain gave excellent winter mountaineering albeit with its associated dangers of avalanche and rockfall. Two high camps were established at 4400m and 5000m and the five-man summit team began their ascent on the 30th of August 1997 at 0500 hrs. They were battling against the driving Atacama winds in temperatures down to -25°C when the youngest soldier on the team had to be evacuated to the high camp because of the effects of hypothermia and frostbite. In true style, Victor cancelled his summit bid to unselfishly assist him off the mountain. LCpl Carl Burkes, LCpl Dave

Mothershaw and John Miles reached the summit at 1450 hrs after a gruelling 10-hour climb. A GPS height survey was initiated and the team left the desert jubilant in achieving a great deal against all the odds.



Sergeant Leighton and Sapper Stevenson fixing a point in the Atacama using GPS.

The expedition was a huge success and gave dramatic adventure in one of the world's most remote regions. The excellent relations developed with the Chilean Army, who offered immense help and assistance, gave us particular satisfaction. The bond developed with the Chileans resulted in an invitation to return to the Atacama in 1998 to finish off the business with Ojos and to prove once and for all that it is the second highest in the Americas. The team celebrated the 250th Anniversary of pioneering survey exploration in true tradition and the benefits gained by the soldiers will be there for years to come. That was our Drama in the Atacama!

NEXT - EXERCISE SIBERIAN APOGEE 2000

There has been secret planning for the next pioneering scheme for some serious adventure during the Millennium year. Once again, the climbers have managed to unveil a secret and little known wilderness of the world which they hope to open up to "new geographic and mountaineering discovery".

Following on from the previous demanding Apogee ventures of the last they are now planning to breach the "untamed" mountains of the Chersky Range in the Russian Far East of Siberia.

Research began in August 1998 giving a two-year lead up to what amounts to one of the most ambitious and logistically demanding scientific expeditions mounted by the Royal Engineers. The Chersky Range is unexplored. It has only been open to western mountaineers since 1995 and so far just one small American team has penetrated its well-defended sanctum (and only just survived!). It is truly one of the world's wilderness regions with areas untrodden by man.

What's more, it has a plethora of alpine peaks awaiting first ascents. The region was considered ideal to echo Military Survey's historic past where earlier surveyors had managed to accomplish feats of "daring do" in their quest to improve geographic knowledge of the world's "uncharted" regions.

The expedition leader, SSgt Stuart Batey, and project coordinator, Mick Jenkins, aim to traverse a small area of the range carrying out scientific surveys and exploratory mountaineering. The small self-sufficient teams will carry out geodetic surveying to aid plate tectonic studies of the "fractured" regions and carry out geological terrain analysis as well as basic GPS heightings of the mountains. The team will also be producing an image map and geographic related data to benefit future explorers. The 14-man team is hoping to work alongside their Russian Army counterparts during a six-week scientific study of the range. Having been helicoptered into a base camp, the team will attempt to climb and accurately height a number of unclimbed peaks between 8-11,000ft in height.

The region is one of the coldest, most inhospitable regions on earth. Winter temperatures have been recorded at -55°C and the area only has a two month summer period (in July and August) conducive to human habitation. A walk out from the mountains would necessitate a life threatening 12-day march across boggy, mosquito-infested tundra. It is as remote gets. Evacuation is impossible other than by helicopter. Self-sufficiency and self-reliance is obligatory.

Logistically, the expedition organisation is very complex. High-technology survey instruments, six weeks of supplies, communications, survival and rescue equipment, and a vast array of climbing and ski equipment means the plan must be absolutely sound. Financially the team is extremely lucky. A major commercial sponsor, ND Service Team of Newbury, has agreed to £12,000 worth of support and equipment - the MOD and the Royal Engineers are fully behind the expedition and it is hoped that the British Mountaineering Council and the Royal Geographical Society will agree to further assistance.

The team will maintain contact with the outside world on their web site and will broadcast live video and diary updates on a daily basis. Much of their planning and organisation has been carried out using perspective views of the imagery which have been manipulated to produce 'fly throughs' of the mountain range. This 'virtual exploration' has advanced to such a level that you can explore the peaks, valleys and routes before setting foot on the ground and save a great deal of recce time.

UK CRUISE MISSILE SUPPORT ACTIVITY

The UK first approached the USA in 1994 on the subject of Tomahawk. Two years later the UK procured the Tomahawk Land Attack Missile (TLAM) weapon system. In addition to the weapon system, a mission planning capability was procured. As a result, the Cruise Missile Support Activity (CMSA) UK was set up within the Northwood Command Centre in Northwood (a leafy up-market suburb in NW London), its role being to provide a mission planning capability for the UK TLAM. CMSA UK, currently staffed by 23 RN, RAF and civilian personnel including five US contractors, is the third centre for mission planning, the other two are located in the US, one in Norfolk, Virginia and the other in Honolulu, Hawaii.

The purpose of the mission planning system is to provide Tomahawk command information to enable the weapon to be successfully deployed against designated targets. The scope of the mission planning system extends from identification of targets, mission production and dissemination of mission to the missile launch platforms. It consists of an integrated suite of workstations broken down into two principle elements Mission Production & Mission Distribution.

Mission Production is conducted at CMSA UK utilising imagery and mapping, charting & geodesy (MC&G) products to:

- select targets & aimpoints
- conduct precise mensuration
- generate products required for TLAM guidance and control
- plan the TLAM route.

Target & aimpoint selection is carried out by the Targeteers/Weaponeers using the Precision Targeting Workstation (PTW).

Image Analysts utilising the Digital Image Workstation Suite (DIWS) carry out precise mensuration and the generation of products for TLAM guidance & control. The TLAM route is prepared by the Strike Planner using the Tomahawk Planning System (TPS).

The Precision Targeting Workstation (PTW) personnel have two main functions:

1. To develop electronic target folders and mission task folders. These are data files, which translate TLAM target data into mission planning requirements.

2. To order, track and evaluate softcopy imagery for use in TLAM planning and subsequent use on the DIWS.

The PTW provides the operator with access to imagery to support target analysis for aimpoint and weapon parameter selection. It also provides weapon performance prediction.

A Military Survey Higher Mapping and Charting Officer (HMCO) is the Imagery Collection Manager responsible for all MC&G and imagery requirements in addition to the Targeteer/Weaponeer duties.

The Digital Image Workstation Suite (DIWS) provides image management, and precise mensuration capabilities required to generate imagery-based products to support the TLAM mission and mission planning. The products consist of:

- Target Complexes (object & aimpoint mensuration)
- Digital Scene Matching & Area Correlation (DSMAC) maps.
- Vertical Update Points
- Terminal Area Digital Terrain Matrices

The DIWS analyst is often required to control the latest rectified imagery using digital PPDB as control before collecting the products. They will then proceed to build wire frame graphics around selected target objects and mensurate precise aimpoints within, as directed by the Targeteer. The DSMAC map compilation is a complex analytical process carried out by the analyst. The aim is to provide a digital binary map that is stored in the missile, such that when the missile overflies the scene area it will match up the pattern of black and white pixels in its memory with those observed on the ground. It is this map, along with the vertical update product (an accurately measured matrix of ground elevation posts), that give the missile its precise accuracy in x, y and z. Stringent quality control procedures are adhered to during all stages of production.

Additional responsibilities for the HMCO include formulating the future training programme, documentation of Standard Operating Procedures, tracking of system software workarounds until superseded by software upgrades and the raising and tracking of system hardware/software discrepancies.

The Tomahawk Planning System (TPS) personnel (all of whom have aviation experience) model the flight characteristics of the TLAM's airframe, the performance of its engines, and the Operational Flight Software algorithms to produce tactically sound flight profiles to assigned targets. TPS also controls the work of the Theatre Mission Planning Centre (ie. All the hardware and software production elements that constitute the CMSA) and prepares and maintains the majority of its planning databases. It determines what imagery products are to be produced and provides approved missions to Mission Distribution System (MDS) for transmission to operational forces.

Mission success is a composite of navigation accuracy, probability of clobber during low altitude terrain following and attrition from enemy missile defence systems. Environmental conditions are accounted for as are known threats and restricted areas. Actions taken early in the flight can have consequences that are not apparent until later in the mission, hence this iterative process requires patience and a unique insight into the missile's behaviour during flight. Assistance is provided by TPS software along with a system of mission verification that includes analysis of all the possible permutations of missile performance in order to optimise the route.

The Mission Distribution System at the CMSA UK is the external link between CMSA UK and the operating forces; providing command information and data. The primary function of MDS is to store the final product and its associated information and distribute this data to the respective nodes and TLAM platforms. This data is stored in the Master Mission Library which is maintained by CMSA UK.

To conclude then:- In less than 5 years from the initial approval for the Feasibility Study, the UK CMSA has been instigated, built, equipped, staffed, trained and put into operational use, with the UK successfully firing its first Tomahawk mission during the Kosovo crisis. Much has been learnt in this short space of time and there is much more to learn and look forward to in the light of future developments.

Keith Vesey

PJHQ Northwood

Have you "Soldiered" on Dartmoor?

An international search is under way to find military and civilian personnel who trained or worked at the Okehampton Military Training Camp on Dartmoor during and since the 2nd World War. Are you one? If so the Museum of Dartmoor Life would like to hear from you. Why? The museum is planning a major exhibition in the year 2000 to celebrate the Life of the Camp over the years, the role it has played in training all of the armed services, particularly during the Falklands Conflict, and its links with the surrounding area and people.

The curator of the museum would like to hear from any organisation or individual who may have photographs, drawings, stories, articles, or memorabilia etc which they would be willing to loan to help mount the exhibition. All loans will be acknowledged in the exhibition.

Contact: The Curator, Museum of Dartmoor Life, 3 West Street, Okehampton, Devon. EX20 1 HQ.

Telephone: 01837 52295.

BUSINESS INFORMATION FOR THE SURVEYING WORLD

by Roy Wood (late of Military Survey and now MD of Geo-UK Ltd)

Having passed my "sell by" date in uniform a few years ago, I faced the usual question of what to do next. Just putting my feet up didn't appeal nor did the idea of another large organisation. However, colleagues in commercial survey and mapping companies indicated that access to information about forthcoming contracts and other business opportunities was not easy to obtain. As such information appeared to be rather fundamental to their businesses, it seemed that there could be an interesting and useful niche in providing a service for them. That meant a plunge into the mysteries of the commercial world and was the beginning of Geo-UK Ltd. Five years on we are continuing to make a profit and to expand with DSA members Robert Dobbie and Jonathan Forbes joining the team in 1998.

So where do we find contract information? Thinking of the Sapper/Gunner interpretations of our common motto "Ubique", we are rather relieved that the Sapper "Everywhere" does not apply although the Gunner version of "All over the place" is all too true. Many of the sources overlap and some which are provided commercially have very strict copyright limits on their use. However, within the EC, there is a legal requirement for all public sector contracts over certain thresholds to be advertised in a publication known as the EC Official Journal and this became our principal source.

The OJ is produced five times each week in Luxembourg with each issue being the equivalent of about 300 pages of very small print and containing towards 1,000 contract notices. These cover every imaginable product and service from bootlaces for the Italian Army, through frozen food and insurance services to simulators for nuclear power stations. In amongst this mass of information are 60-100 notices each week of potential interest to land and hydrographic surveyors, mappers and charters and those working with geographic information systems. Our business depends on finding these needles in a not very friendly haystack and getting them out to our subscribers promptly and in a convenient form.

Our bulletins are issued twice each week and, with a recent expansion to a new product aimed at the property, construction and building sectors and pages in a number of magazines, we are kept on our toes with at least five publishing deadlines to meet every week. Although we started off with distribution by fax, Internet developments mean that we now depend on e-mail so we can claim to be one of those dot.com electronic publishing companies which seem to intrigue the media.

So what kind of contracts do we find for our survey, mapping and GIS clients? In a rather arbitrary way we divide notices into those of which specify the need for some form of survey, mapping or GIS - "Geographical Services" in our terms and "Other Projects" which we judge would need or benefit from a geospatial input.

In recent months our Geographical Services lists have seen a number of interesting contract requirements from the Ordnance Survey including, at last, a pilot project to tackle that old "Cotswold Adjustment" problem involving the total resurvey of selected areas at 1:2,500. There has also been a more general contract for the revision of the National Topographic Database. OS equipment requirements include an updated pen computer system to improve digital data collection in the field and an integrated DGPS/inertial navigation system to provide the full exterior orientation parameters for each exposure of their aerial survey cameras. Also in UK the Ministry of Defence is advertising for 60 GPS receivers for RAF radar and command and control systems and the Hydrographer is making extensive use of commercial contracts with a recent notice for comprehensive surveys of the continental shelf of the UK. Oil and gas companies use the OJ to advertise for a variety of DGPS positioning, seabed surveys, geophysical, geotechnical and sonar surveys.

The development of a National Land Information Service to bring together digital data from OS, the Land Registry, Local Authorities and many other data suppliers was the subject of an important notice of great interest to our subscribers. The "Right to Roam" controversy over access to open countryside has been in the media recently. This clearly requires knowledge of what land is being considered and we have just included a contract from the Countryside Agency to provide the necessary mapping of all current access areas in England.

The Highways Agency is another regular source of contracts with a recent requirement to study the potential of remote sensing to inspect and assess the condition of its "large linear geotechnical asset" (roads to you and me!). GPS positioning is also required for condition surveys of roads in Scotland. Survey opportunities also pop up in long lists of general services from local authorities and utilities and it is not unusual to find topographic surveys or digital mapping sandwiched between ventilation contractors and meter maintenance services.

Outside the UK we see the effect of different approaches to national mapping. In France, for instance, IGN are only responsible for the small and medium scales so there are many contracts from local authorities and utilities for large scale surveys, mapping and orthophotography. Much the same applies in Germany and Spain. Conversely the Danes have a central organisation but put a great deal of work out to contract, a good proportion of which has been won by British companies. Norway has been active with hydrographic work with electronic navigation chart production and deepwater bathymetric data collection. There is also a steady flow of work from various EC Directorates and Agencies with the Joint Research Centre in Italy in particular putting out interesting notices for GIS interoperability and remote sensing/photogrammetry studies.

The Geographical Services category is fairly straightforward but, once we move to our Other Projects heading, the imagination and experience of our reviewers really comes into play. Here we are looking for applications which are likely to be sub contracts for our subscribers. Sometimes the geospatial angle may be indicated in the contract notice but in many cases the contracting authority has certainly not appreciated that a GIS or an accurate map would be an important part of the work.

The environment provides quite rich pickings with contracts ranging from environmental impact assessments for developments, flood alleviation schemes, noise monitoring, simulations for pollution monitoring and the impact on the environment of topics as varied as air travel, genetically modified crops and the war in Kosovo. The situation in Kosovo has also given rise to a requirement for test facilities to study demining and explosive detection systems. Allied to the environmental contracts are notices showing efforts to monitor and control Common Agricultural Policy subsidies through remote sensing and the inspection of crops on the ground.

Road and rail planning are well represented in this section of our bulletins with UK examples such as a safety study of the A1 and planning for the proposed tunnel under the Hindhead area on the A3. Various by-pass planning and

construction contracts are also reappearing now that such work is once again politically acceptable. Requirements for vehicle location systems for buses and more particularly for police, fire and ambulance services appear quite frequently, often giving opportunities for GIS and digital mapping as well as for GPS applications. For the railways we have watched notices for the various stages of the fast link now under construction from the Channel Tunnel to London, including archaeological investigations; the on again, off again plans for the CrossRail project under London and the development of the Light Rail system in Dublin. There are also contracts for air traffic control which will need mapping and for telecommunications planning which will depend on signal propagation data based on the terrain.

Digitisation is another area of opportunity for a number of our subscribers as local authorities, utilities and others make the move from plan presses full of annotated paper maps to digital data. It has been interesting to find that a considerable amount of this work has moved offshore with India, Malaysia and the Philippines known to be active. With the rapid spread of GIS into local authorities, we also keep an eye open for buys of new PCs. New hardware often means new software and a possibility of new data thus providing an opportunity for the GIS, orthophoto and digital map vendors to make an approach.

So what started as a fairly modest venture has developed into quite a substantial business service with subscribers from as far afield as California and Slovakia. A sharp eye is always needed for cases such as a complete resurvey of the Paris Metro which was hidden under a "Floor Screeding" heading and the range of topics never ceases to amaze and sometimes amuse us. We were sad to see the Norwegians cancelling a contract for Christmas Trees in early December. However, when we read further and found that it referred to those sea floor valve assemblies used in the oil and gas industry, it seemed that the Scandinavian seasonal spirit was not under threat after all. And finally, what, we wonder, was behind that large contract for crocheted swimwear from a French government department?

ORDNANCE SURVEY

MAP MAKERS OF THE PAST - AND THE FUTURE

by Paula Good

Today, Ordnance Survey is a £100 million a year business, covering its costs by selling products and services or licensing others to use its copyright material.

The Government has recently introduced two particular measures designed to support Ordnance Survey and its work. It changed its status to become a 'Trading Fund', which means it has more responsibility for its own finances and planning and more freedom to develop more opportunities. Secondly, it allocated substantial funding for mapping activities that are vital to the national interest but which will always be uneconomic.

That funding, provided through a contract called NIMSA - National Interest Mapping Services Agreement - recognises that Ordnance Survey carries out a range of duties which, although not in themselves commercially justified, are fundamental to the overall well-being of the nation. They include such issues as keeping the mapping of rural areas up-to-date and major improvements to Ordnance Survey's national computer database. Other provisions include the recording of Welsh and Gaelic names on maps and the creation of a three-dimensional geographical positioning network for Britain, integrating information on the ground with that provided by orbiting satellites.

"Ordnance Survey is recognised as a world leader in computer mapping technology," says the agency's acting Director General, David Willey. "In 1995, we became the first mapping agency in the world to convert every one of our country's most detailed large-scale maps to digital form for use on computers. Ordnance Survey now holds a 'master map of Britain' containing more than 200 million individual features of the British landscape."



*Ordnance Survey's Jo Lines uses the latest computer technology to update one of the Landranger maps.
Photograph: Ordnance Survey*

The most detailed Ordnance Survey digital product, Land-Line, can be mixed together with another product called ADDRESS-POINT, which features the precise location of every postal address in the country. With each postal address is a national grid reference and also a unique reference number.

Ordnance Survey is also responsible for the roads information within many in-car navigation systems in Britain. It provides the detailed base mapping - called OSCAR - for software system production companies to use with their equipment.

The digital technology that Ordnance Survey has embraced over the years means maps can be updated far quicker than ever before. The Ordnance Survey surveyor now draws revision detail directly on to a hand-held pen computer - a system called PRISM and instead of sending that information back to head office in Southampton by post, the data can be transferred, via telephone lines, to Ordnance Survey's main computer. This means that updated maps of an area can be available to customers literally the next day in many cases - through a network of Ordnance Survey Superplan Agents' shops around the country. In the past, it sometimes took years for that same information to make it on to an updated map.

The Internet is an area full of opportunities for Ordnance Survey - particularly e-business and the on-line supply of its data. Motoring mapping is already being given away on Ordnance Survey's web site and businesses and individuals alike are encouraged to take mapping extracts for their own web pages. In its first six months on the web site, this service received more than one million 'hits' - paving the way for

Ordnance Survey to become an even bigger presence on the Internet in the months to come. Commercial data supply via the net is a key objective of the mapping agency's new business plan.

Another initiative already underway is Ordnance Survey's work on creating a new national GPS network to complement its National Grid, and offering an easily-accessible transformation service - giving swift conversions from GPS positions to National Grid co-ordinates. This would allow them to be used with existing data at the touch of a button.

The databases holding Ordnance Survey's digital products are also to be completely restructured and enhanced to make it easier for other people's information to be integrated, held as separate layers, or be easily associated with Ordnance Survey data. For example, work is underway for Ordnance Survey to give every feature on its most detailed maps a unique identifier, starting with the 40 million buildings in Britain - whether or not they have postal addresses. This is intended to dramatically ease the task of adding or associating additional information to any of them. The industry-wide opportunities that will be opened by this kind of referencing system will be enormous - so Ordnance Survey has every intention of making the unique identifiers widely available.



*An Ordnance Survey surveyor using PRISM to update maps.
Photograph: Ordnance Survey*

This has wide implications for many businesses and public services. For example, the identifiers could be used to mix traditional map data with different images - video material perhaps. The restructuring will also put Ordnance

Survey in a position to provide people with the exact information they need, not forcing them to accept volumes of information that they don't really need.

None of this means that the mapping agency will stop producing the much-loved Ordnance Survey map. It will continue to publish high-quality, standard paper maps such as the Landranger, Outdoor Leisure and Explorer maps series but increasingly the agency believes that people will want maps printed on demand and customised to whatever mixture of Ordnance Survey or third party data meets their needs.

However, Ordnance Survey will no longer be involved in publishing atlases and guides but instead has invited previous co-publishers, like Philips', to become licensees of its data - this would give them sole responsibility for the titles. Once this transfer is complete, it will be clear that, whilst Ordnance Survey is keen to encourage the use of its data, it will no longer compete with licensees in their established markets.

"In making all these changes, we hope to determine the shape of our organisation for decades to come," says Director General, David Willey. "Ordnance Survey has already been a pioneer in developing many aspects of the role of a national mapping agency in the modern world. Like all mapping agencies, we are faced with the challenges arising from a potent mixture of technical, economic, competitive and political challenges - and opportunities.

The mapping agency's key aim is not to maximise profits, but to contribute to national development by encouraging much more use of its data, particularly by those who may not have considered using it in the past. A recent independent survey has shown that approximately £100 billion a year of value added to the British economy is dependent to some extent on Ordnance Survey information.

The Strange Failure of German Sound Ranging in the First World War: Part 1

by Peter Chasseaud FRGS Hon. Archivist of the Defence Surveyors Association

The need accurately to locate the enemy's guns so that they could be destroyed or neutralised before and during an attack was recognised within a very few weeks of the outbreak of war in 1914, and was particularly associated with the development of entrenched positions, as on the Aisne in September. By November 1914 the whole of the Western Front had become entrenched, the war had taken on the nature of a protracted siege, and counter-battery (CB) work quickly evolved.

At first most enemy-battery-locations were by gunner forward observation officers (FOOs), and by pilots and observers of the Royal Flying Corps, soon supplemented by air photos, the first of which were taken by the British on the Aisne. The early air photos left much to be desired, but soon all major belligerents had rapidly developed these into a remarkably effective source of tactical intelligence. Within a few months good air cameras were generating extremely clear photographs but the art of interpretation lagged behind. There was a shortage of aircraft and cameras, and a pressing need for accurate and up-to-date information on enemy battery positions and their state of occupation and activity. While air photos could often pinpoint the gunpits, they could not always spot guns actually in position, or tell if those guns were active.

The idea of locating an enemy gun by recording the times at which the report of its firing reached certain fixed positions was already old in 1914. Lt.-Col. Winterbotham RE, who with Col. E.M. Jack RE was responsible for the massive and efficient growth of the British survey organisation on the Western Front, mentions discussion of it 'many years ago' in Austria in his 1918 Report,¹ and less than a year before war broke out, on 6th October 1913, Captain Lowenstein of the German Army took out a State Patent on:

A proceeding for determining the position of sound-producing objects, characterized by reception of the sound, conveyed through air, water, or the earth, at not less than three places, and by determining the differences in the times of arrival of the sounds, either by persons or by means of electrical receiving and registering apparatus.²

He also proposed, in a memorandum to the Artillery Proof Committee (*Artillerie-Prüfungs-Kommission* or *APK*) in Berlin in October 1913, to use microphones for listening purposes.³

At the outbreak of war the French, soon followed by the British, developed systematic and scientific flash-spotting and sound-ranging, and

these successful applications of technology to war are well documented⁴. The French developed several sound-ranging methods: tapping keys, stop-watch, Claude 'Orthophone' (ear trumpets on long arms), and sophisticated electrical oscillograph and Einthoven galvanometer systems. The automatic electrical systems could measure extremely small time differences and, as microphones were developed which could distinguish between the gun report and the 'onde-de-choc' or shell wave, became exceedingly accurate. The Bull apparatus, based on the Einthoven 6-string galvanometer, was adopted by the British in the summer of 1915 and at the end of 1917 by the Americans. Lucien Bull was working on electro-cardiography at the Institut Marey in Paris, hence his adaption of the Einthoven galvanometer for sound-ranging in October-November 1914. The Tucker hot-wire microphone, very sensitive to the low-pressure gun report, was invented in June 1916 and all British sound-ranging sections were equipped with it by September. The Germans were well equipped for flash-spotting, and their artillery survey *messplanabteilung* had been extremely effective in helping to destroy the Belgian forts during the initial advance. While they were aware of the possibilities of sound-ranging, however, they soon made a crucial error in refusing to permit scarce scientific and industrial resources to be allocated to this vital activity. They never recovered from this setback.

Following the stabilisation of the front, Lowenstein (see above) made the first German sound-ranging observations and measurements in October 1914 at La Bassée, which convinced the initially sceptical artillery commanders of the German VII and XIV Corps. Unfortunately, we do not know what method or equipment he was using, but it may well have been the simple human-observer and stopwatch method. The first successful location by the Germans took place in November 1914 when the German 76th Field Artillery Brigade located an Allied gun in a wood south of the La Bassée Canal. Shortly afterwards, the Germans used sound-ranging to locate a gun or guns firing from points along the Béthune - La Bassée railway, which led them to suspect a rail-mounted gun. The Germans' suspicions were confirmed by the capture of an RE officer, with his notebook full of revealing information, who had been working for the railway gun.⁵ British records cannot, unfortunately, be found to corroborate or amplify this incident. Early in 1915, German sound-ranging had developed to the extent that they had 8 sound-ranging sections

on a line of overlapping bases from Ypres to Arras, and probably also on other parts of the front. They also used sound-ranging successfully for registering (ranging their own guns onto the target and recording the data). They were increasing the number of stations as late as the end of 1917,⁶ though the late expansion may have been due to their crucial neglect of automatic recording apparatus, as we shall see.

At the beginning of 1915 Professor Fredenhagen of Leipzig University had constructed and delivered to expert examination an oscillograph by means of which, when it was finally adopted at the beginning of 1918, at least six simultaneously firing batteries could be fixed with times to their position. Experiments continued at the front with this apparatus, and also with string-galvanometers and other 'objective' recording methods, over the next three years. Max Eckert was enraged that it took so long for this 'objective method' of location to be adopted. He was convinced by Fredenhagen's demonstrations at the front that his apparatus had achieved superiority, and that this three-year delay allowed what he called the similar English apparatus (the Bull-Tucker, based on the string-galvanometer) to become superior in efficiency.⁷ Siegfried Boelcke, the German War Survey Chief, believed as we shall see, that the delay was due to the opposition of old, regular gunners who regarded 'technical assistance' with disdain!

The German physicist Max Born, finding in June 1915 that Professor Max Wien was forming an experimental unit of physicists and technicians to develop wireless for aircraft, joined these young professors and staff from the German National Physical Laboratory at Döberitz near Spandau. His friend, Rudolf Ladenburg, a reserve cavalry captain who among many others had turned his mind to sound-ranging, was one of the first to convince the general staff that this method of locating enemy batteries had potential, and was ordered to Berlin to help to organise a research department to develop all methods of 'scientific ranging,' this included optical (flash-spotting), accoustical (sound-ranging), seismometric (earth tremors), electromagnetic, etc. This department was part of the *Artillerie-Prüfungs-Kommission* (APK), based in the Kaiser-Allee, which had the task of investigating all inventions relating to artillery. The technical officers of the APK had been

assigned to combatant units on mobilisation, so it was effectively defunct until the staff became concerned about the superiority of the French artillery and recalled the officers; by this time, however, many of these technical experts had been killed, and replacements including Ladenburg were brought in. Another newcomer, given command of this department, was von Jagwitz, a Prussian infantry captain and a typical Junker, who established his office in Spichern Strasse near the Bavarian Quarter and conveniently close to the house of Born's friend, Albert Einstein.⁸

After about six weeks with the air force wireless development unit, Born, who was suffering from asthma and bronchial problems, was rescued by Ladenburg who, in about August 1915, recruited him to the APK. Despite the immense gulf of rank (Born was still only a private at this stage, though he was later promoted to sergeant and eventually commissioned), Jagwitz took Born into his confidence and sought his advice on staffing and physical problems. Born judged that Jagwitz - the key figure in German sound-ranging - was 'ambitious and energetic where his own career was concerned, but tending to laziness' and neglecting his duties when they could not help his promotion.⁹ Born also believed that Jagwitz avoided being sent to the front by making himself indispensable to the APK by accumulating as many experts as possible and using their collaboration to make the reputation of his department. Empire-building is not the province of any one nation! Office hours were 9am to 4pm, and at first Born assisted Ladenburg to develop numerical and graphic methods for sound-ranging sections at the front and, supervised by Jagwitz, to draft these in military jargon.⁹



German surveyors in the trenches 1916.

By August 1915 APK experiments had shown that it was possible to fix the position of a gun accurately from shell-velocities if the velocity of the shell was less than the speed of sound. It was also possible to obtain useable data for the location of enemy batteries from shell-velocities of high-velocity (HV) guns with a speed greater than that of sound. The distinction between the gun-report and the shell-wave had been recognised, and a method evolved to combine data from these to locate the hostile gun. At this time the German high command finally decided to form the first sound-ranging sections, or Schallmesstrupps (SMTs) using the subjective (stop-watch/tapping key method). Telegraphic and other equipment was to be supplied by the APK. A training school was therefore established by the APK at Kummersdorf to train an 11-man section (SMT) from each army and army-detachment in 3

courses, each lasting a fortnight. The first started on 1st September and the last finished on 15th October 1915. 18 sections in all were trained by the course leader, Telegraphic Captain Schade. Further sections were to be trained in the field by these original 18. It was also suggested at this time, almost as an afterthought, that armies should send trained physicists, electrical engineers and mechanics to Kammersdorf to receive instruction in sound-ranging. The new SMTs were to be affiliated to artillery survey units (Messplan-Abteilungen) or other appropriate units.¹⁰

Max Eckert, who served with a German survey unit at the front, noted that the measuring of the time interval between the arrival of the sound-wave at the fixed posts of the section was done in a completely primitive way with stopwatches, and was called the 'subjective method' of sound-ranging. Only single batteries could be fixed on quiet fronts by this method, but it was useless in heavy or drumfire (Eckert 1921).¹¹ The British found that the Germans were using the crude graphic method of plotting families of hyperbolae for each sub-base (2 observers) on the HQ plotting board. This method had also been tried by the British, but was found by them to be confusing and time consuming, and was soon replaced by the asymptote method and the intersection of weighted threads.¹² Born later calculated the influence on the sound-wave of the wind at different altitudes. His staff, comprising maths and physics students pulled out of the field army, calculated tables from his formulae, and the results were 'quite well confirmed' by experiments on a firing range. At the beginning of the Second World War Born offered this method and other relevant material to the British, but was told that they had developed similar methods.¹³ Born was hardly overworked, and found the time to work on several scientific papers during his years with the APK.

The first member of Born's staff was a former pupil, Landé.¹⁴ Later members included Wätzmann, an acoustics specialist from Breslau University, Kurlbaum from Charlottenburg, and Madelung and Reich from Göttingen. German sound-ranging now took a wrong turning from which it never recovered, because of a serious resource-allocation misjudgement by the staff, who refused to allow oscillograph electrical-

recording equipment, vital for measuring brief time-intervals, to be ordered from Siemens and Halske, General Electric or other electrical firms, who could not meet existing orders for equipment for other purposes. Thus it was that the German sound-ranging research effort turned to the use of stop-watches and the psychologists, a method which the French and British had already abandoned! The stop-watches were Swiss, and could register up to a fiftieth of a second, while the psychologists were brought into the department to develop methods of selecting and training specialist observers with a reasonably constant reaction time. This had been done by the French in 1914-15. Born noted that 'this rough procedure worked better than one would expect, although the British automatic instruments used in later phases of the war were definitely superior.'¹⁵ In fact all British sound-ranging sections were equipped with the excellent Bull apparatus from late 1915, and the vital Tucker microphone from September 1916. Willie Bragg, the British sound-

ranging pioneer and chief, in a post-war discussion told Born that he was distinctly unimpressed with the German method. Born, in turn, did not think that the greater accuracy of the British instruments was much use, citing many sources of error including wind and weather, noise interference, and the head-waves (*ondes-de-choc* or shock waves) of high-velocity shells. Bragg, Tucker and Joe Gray, with their



Major Siegfried Boelcke.
The German War Survey Chief.



Trigonometrical Troop of 13 Vermessungsabteilung with transport.

experimental sound-ranging sections and wind sections, at the front, at GHQ and at the Overseas Artillery School at Chapperton Down on Salisbury Plain had in fact solved most of these problems. Wind and atmospheric corrections had been calculated, the Tucker microphone clearly distinguished between the gun report, the shock-wave and the shell burst, while the Einhoven galvanometer registering and recording apparatus enabled practically simultaneous gun-firing records to be disentangled. The main problem faced by British sound-ranging was persistent

westerly winds which, during the Passchendaele (Third Ypres) battle for example, blew the sound wave from German guns up and away from the microphone bases and favoured German sound-ranging.

Wertheimer and von Hornbostel, members of Köhler's Gestalt psychology group, and both Austrian Jews, joined the department and developed a sound direction-finder after discovering that the ability of a human observer to estimate the direction of the source of a sound depends on the time-difference between the sound-wave arriving at each ear. The distance between the ears forms the base, and the shortness of this limits the accuracy; the length of the base, and thus the accuracy, could be increased by mounting two microphones, connected to earphones, at a greater distance. With such an apparatus Born claimed the direction of an enemy gun could be found to a fraction of a degree, and this system was used successfully at the front.¹⁴ Each German sound-ranging post therefore had two microphones, a stopwatch and a telephone connection to the section HQ; there was one section (*schallmesstrupp*) to each front-line division. Early in the war the French used a similar system, the Claude Orthophone, which



Surveyors at work in southern Alsace.



Observer and booker at work.

involved ear-trumpets on long arms; they did not, apparently, connect this to microphones, instead moving directly on to automatic recording apparatus (such as the Bull) connected to a microphone array. The British also briefly used stop-watch and orthophone sections to fill gaps between regular (Bull) sections.

Shortly after joining the department, Jagwitz took Sergeant Born and some officers to Austria and Hungary to make comparisons with Austrian sound-ranging methods. Unfortunately, Born gave no details of these. Arriving at the frontier station of Oderburg they were met by the Austrian

delegation under General Austerlitz. Introduced by Jagwitz as Sergeant Professor, Born was immediately taken up by the General who was himself a mathematician and knew of his work, and they discussed scientific problems in the General's private compartment all the way to Vienna. They went on to Budapest, and further to a large camp in the Carpathians where the Germans demonstrated their methods.¹⁷

Following the establishment of their sound-ranging method, members of the department frequently visited the front to inspect the sections (*schallmesstrupp*), which were artillery units. Born made his first visit to the Western Front with Jagwitz, to the bloodbath of the Somme battlefield ('the muddy grave of the German field army'), where they planned to inspect two sound-ranging posts; the first was in a fetid dugout on top of a flat hill, and they couldn't reach the second because of shellfire. Born lay in a ditch on the hill by the first post watching, at a distance of a mile or two, miles of front marked by 'a terrible wall of smoke and fire, and a hellish noise.'¹⁸ His later visits to the front (Alsace and Flanders) were always in quiet periods. Once he went with Ladenburg to an APK experimental station in a small chateau near the Ypres front to test a new piece of equipment. He never went to the Eastern Front.

References:

1. Winterbotham, H.S.J.L., *Survey on the Western Front* (typescript), Mapc GHQ, 20th December 1918, 32. This was Winterbotham's preliminary report, which formed the basis for Jack's *Report on Survey on the Western Front* (HMSO 1920).
2. *Royal Engineers Journal* (REJ), June 1929, 334.
3. *Ibid.*
4. See, for example: *Report on Survey on the Western Front*, War Office 1920; Bragg, Dawson & Hemming, *Artillery Survey in the First World War*, Field Survey Association 1971; Peter Chasman, *Artillery's Astrologers*, Mapbooks 1999.
5. REJ, op. cit.
6. *Ibid.*
7. Eckert, Max, *Die Kartographie im Krieg*, *Geographische Zeitschrift*, 27. Jahrg. (1921), Part 4, 22.
8. Born, Max, *My Life. Recollections of a Nobel Laureate*, Taylor & Francis, London, 1978, 168-170.
9. *Ibid.*, 170.
10. Bundesarchiv-Militärarchiv PH3/506.
11. Eckert, Max, *Die Kartographie im Krieg*, *Geographische Zeitschrift*, 27. Jahrg. (1921), Part 4, 22.
12. *Report on Survey on the Western Front*, War Office, 1920, 115.
13. Born, op. cit., 171.
14. *Ibid.*
15. *Ibid.*, 173.
16. *Ibid.*, 174. *Ibid.*
17. 172.
18. *Ibid.*

The Total Eclipse 1999

My son announced that he and a friend wanted to go and view the total eclipse in Cornwall, and when they got the old tent out and practiced putting it up in the garden I realised that they was serious so we set up a proper expedition to France. We travelled through the chunnel and drove down to Bethune where we got the last room in the town at 'Le Vieux Beffroi'. Aptly named, the belfry was just outside our window and the carillon played almost-recognisable tunes every fifteen minutes! However we did enjoy an excellent dinner at La Coupole.

Early the next morning we set off down the Autoroute to get onto the centre line. The French police were giving out notices telling drivers to keep their headlights on as darkness would come very suddenly. Traffic at the exit Peage was backing up down onto the Autoroute with streams of cars coming down from Belgium so the clerk did the only sensible thing, opened the gate and let everyone through without payment.

LOG OF THE ECLIPSE - 11 AUGUST 1999

Place: A field on the North side of the D35, just East of the village of Remies, France. **GPS fix:** 49° 41.08N, 3° 32.43E (Estimated probable error: 7m)

Time: 09:13 UT. The weather is a little overcast with some high thin cloud and patches of low cloud skidding across from the North East. Surface wind is also from the North East. As the eclipse starts we get views of the Sun's disc through the clouds with the Moon gradually obscuring it from the top right.

Time: 10:00 UT. The Sun's disc is more than half covered. Happy group of people watching through goggles and welders' glass. One telescope is set up with a reflector onto a piece of white card. Super reflections of the crescent Sun in the car windscreen and paintwork. It feels as if it is getting colder.



*The eclipse is near total.
Photograph: Dr Larry Collins*

Time: 10:08 UT. The light is going. It feels like evening with a little chill in the air, but the light is coming from high in the sky rather than low in the West.

Time: 10:12 UT. Shadows with double edges (fringe in the vertical line). Shadows gradually going as the amount of low cloud increases. As it gets darker colours are fading a little and the world looks like the old cowboy films shot during the day with a dark filter to make it look like night. Cars drive past with headlights on.

Time: 10:16 UT. No bird song because we have seen no birds! The chill seems to be causing more low cloud to form. I put on my coat. People chat happily and the motorcyclists roar off in search of a better spot and a gap through the clouds - good luck to them.

Time: 10:19 UT. Just a sliver of Sun seen through the clouds (Altitude about 50, Azimuth about 140). It is getting darker and we have no torch.

Time: 10:22 UT. Getting very dark quite suddenly. Charlie shouts, "Here it comes!". He is pointing to the West, and from more than 20 miles away we see 'blackness' rushing at us at about 1000 mph. In an instant it is quite dark and cold. I can't see my watch to log the time (about 10:24?). Too much cloud to see the stars or the Sun's Corona. People stand in the dark looking around the horizon, some parts of which glow with light. Some are excited and shout or cheer others stand in silent awe. One can imagine that a primitive people would be very afraid that the Sun had been eaten by some great monster and might make a lot of noise to try and frighten it away. After about two minutes, the light starts to come back from the western horizon. Odd to see first light dawning in the West!

Time: 10:47 UT. It is now quite bright again. The world is warmer and getting back to normal. A French car rushes up and kids pour out to look at the Sun through their goggles. I don't like to tell them that they have missed the main event!

Time: 11:43 UT. Sun's disc is just about complete. Nice warm sunshine and a clear sky. The eclipse is over.

We drive back to Bethune via the little Commonwealth War Graves cemetery at Chapel Corner where the boys sign the Visitors Book. The next day is spent visiting Dunkirk and the gun emplacements at Cap Griz Nez from where we can see Dover Castle and the big radar tower from the Battle of Britain. Of course we also make a visit to Intermache to stock up the wine cellar. An easy run home with lots of good memories and a story to tell.

Robert Dobbie

NOTICE

Peter Chasseaud is giving a presentation on 'Artillery in the First World War' to the RA Historical Society at Larkhill on the 26th of April 2000

THE WARTIME NEWS

The editor has received a copy of an extremely interesting journal called the Wartime News. It consists of well-written personal experiences of a wide variety of people who took part in the Second World War. Most are previously unpublished and written in such a way as to bring into sharp focus the reality of life for the ordinary person at that time. It is highly recommended to anyone who has an interest in that period and Association members may obtain a complimentary copy by telephoning 01202 503902 or writing to:

The Wartime Company, Studland House, 12 Christchurch Road, Bournemouth. BH1 3NA

MAJOR-GENERAL RCA "JOE" EDGE

Major-General RCA "Joe" Edge, the former Director General of Ordnance Survey who has died aged 87, had an adventurous career in which he climbed and surveyed hitherto unknown, inaccessible and politically sensitive territory in the Himalayas. With a fellow lieutenant, he made the first crossing of the Gupt Khal Pass (18,990ft) over the Ohaul and Alaknanda watersheds.

After retiring from the Army in 1971 he was appointed an independent inspector of Government projects, which included proposals to build the M11 Cambridge bypass, the M40 and the M42, and the M3 Winchester bypass. "All these inquiries", he recalled "were interesting, controversial and sometimes noisy, especially Winchester, where I gained some notoriety by ejecting the Headmaster of Winchester College from the meeting for bad behaviour".

Raymond Cyril Alexander Edge was born on July 21 1912; one of his cousins was the author John Masters. He was educated at Cheltenham, Woolwich and Gonville and Caius College, Cambridge, and was commissioned into the Royal Engineers in 1932. He was a prize Cadet at Woolwich.

In 1936, Edge was posted to India, where his family's military service extended back to his great-great-great-grandfather who had served in the Mysore Wars.

While stationed at Kirkee, Edge learned that instead of going with his company to the North West Frontier, he would be left languishing with the Training Battalion in place of an officer on leave. This caused him to develop a sudden interest in map-making, which would involve a transfer to the Survey of India, which at the time was mapping the Himalayas.

Edge's first task was to survey the Garhwal and Kumaon Himalayas, to which he went with a party that included Sherpa Tenzing, later to become famous as one of the first two men to set foot on the summit of Everest.

Frostbite and snow blindness made these early ventures hazardous, but Edge made the first ascent of Uja Tircbe (20,350ft). Later projects included mapping the jungles of the Deccan and an air survey of the North West Frontier.

After the outbreak of war in 1939, Edge was moved to more mundane duties in Delhi, but in 1942 he was posted with 3 Field Company to establish hurried harbour defences in Ceylon and the Maldives Islands. This task completed he was then posted to 14 Army in Burma as Assistant Director of Survey in 15 Corps.

He served throughout the Arakan offensive and the Japanese attempt to break through at Imphal, and later witnessed the Japanese surrender ceremonies in Rangoon and Singapore.

In 1946 Edge, back with the Survey of India, was posted to the North West Frontier in a period of turbulent unrest. After partition in 1947 he became Director General of the new Survey of Pakistan and had the onerous task of determining disputed boundaries. On one occasion he prevented a lynching by driving a shot-down pilot to safety in an open truck through a hostile mob.

After returning to England in 1949, Edge worked in survey at the War Office and in BAOR before being posted to Ordnance Survey as Deputy Director, Geodetic Control.

In 1958 he was posted to Cyprus as Deputy Director Survey, Middle East, which encompassed Malta through to Pakistan and south to central Africa; much of this territory was experiencing unrest of one kind or another.

Edge returned to England and the Ordnance Survey in 1961, becoming Director General in 1965. He supervised the move of the Department from Chessington to new buildings at Southampton.

Outside his official sphere, Edge was active in many professional and scientific fields connected with the Survey and he made contributions to many learned journals. He was Chairman of the Field Survey Association in 1968 and 1969.

He was awarded an MBE in 1945 and mentioned in despatches. He was appointed CB in 1968.

Joe Edge had been a keen all-rounder in his youth, particularly at rugby, tennis, sailing and riding. He was always ready to listen and learn. He was a lover of music and latterly took up chess.

Edge was endowed with a keen sense of humour, which proved invaluable in meetings, especially when noisy objectors sat with their backs to him in the audience. His ability to remain friendly and calm under pressure made him liked and respected.

He married first, in 1939, Patricia McKee, who died in 1982. They had a son and a daughter. He married secondly, in 1983, Audrey Muers-Raby, who survives him.

First published in the Daily Telegraph

BOOK REVIEWS: ARTILLERY'S ASTROLOGERS

Artillery's Astrologers. A history of British survey and mapping on the Western Front 1914-1918

P Chasseaud. 1999. 558 pages A4 format. £50 ISBN 0-951 2080-2-0

Published by Mapbooks, 17 St Anne's Crescent, Lewes, E.Sussex BN7 1SB.

Well known DSA member, Peter Chasseaud, has written such an epic tome detailing the survey support to the Artillery during the First World War that we asked three members to review it.

Peter Chasseaud is an acknowledged expert in the field of cartography and map production with a deep interest in maps of the First World War. He has written widely on this subject and has assisted in the production of television programmes which have proved so popular in recent months.

In writing this historical volume on the 1914-18 War, the author has distilled the results of his research over twenty years, producing a magnificent book which makes fascinating reading for anyone connected with the discipline of mapping for military purposes, or who may wish to access a work of reference on the personalities, organisations, and techniques for surveys and maps developed largely to support the artillery. The increasing accuracy requirements for indirect fire, and the developing arts of flash spotting and sound ranging and how these affected RE Survey and Artillery organisation, doctrine and training are examined in detail.

Other works have dealt with global events leading to the War and the military and political experiences of the early part of the twentieth century. Peter Chasseaud leads the reader through the pre-war background of national mapping in the United Kingdom and on the continent and the contemporary state of development in surveying instruments, photo mapping, both ground and air, including balloons, and in surveying for indirect fire. The lack of surveys for field batteries, and the consequent

waste of ammunition for ranging shots, sets the scene for many of the improvements in artillery surveys during the course of the war.

There follows the experience of the first few months of the war and the inevitable rapid review of requirements, methods, resources and organisations. Early contact with the Germans revealed their superiority in directing artillery fire by visual signals. Experiments by the 1st Ranging Section RE emphasised the need for accurate surveys and maps to assist with aerial spotting of targets and to lay down accurate indirect fire. At this stage of the war it became clear that many gunners regarded the business of survey with awe and were remarkably ignorant as to its potential. This view was to change in subsequent months!

The policy on maps and surveys in 1915-16 is covered in some detail, from the need to acquire existing maps of the theatre of operations, the production of trench maps, with their ever-changing pattern, map distribution, and the formation of Topographical Sections and Field Survey Companies "to co-ordinate and control all work in connection with the preparation of maps and the fixation of hostile objectives".

In this artillery war the influence of survey was considerable. The intense experimentation and continual developments in this four-year period are detailed in this definitive operational history of field survey organisation, units and personnel on the Western Front. Peter Chasseaud has brought together a mass of well-researched historical information in a well-presented volume, surprisingly detailed despite the loss of many documents from that period. The volume is not exactly bedtime reading but it would be a valuable addition to libraries and to geographic organisations.

EW Barton

Peter Chasseaud is well known for his interest in the First World War and his previous publications relating to trench maps. This latest work is a monumental one both in size and detail. It chronicles all aspects of surveying and mapping and the various developments that were made during the campaigns. It is written in an easy style and although the reader will probably be inclined to pick specific sections to read it is possible that the enthusiast might well find himself going all the way through.

A huge amount of research has obviously gone into this in order to achieve the detail of troop deployment, sheets within map series, the personnel within particular Groups and the movements of Groups and even different printings of particular map series.

To the non-military survey reader many of the names mentioned ring their own bells in one's memory. Such personalities as Close, Winterbotham, McCaw, Macleod and Simms feature extensively and all readers will know well how these names influenced survey for many years after the War.

Many of the chapters revolve around the activities of particular Field Survey Companies during specific battles. Before that however the initial chapters fill in the background of preparations prior to the declaration of war and the development early in the war of the survey personnel. Even the first sentence of chapter 1 is a telling one. "It is a considerable irony that France, which led the world in the 18th century with the first scientifically based national survey, should by 1914 be one of the worst-mapped countries in Europe." It was on a foundation such as this that the war was fought.

The basis of the early Survey Companies came from military staff based at the Ordnance Survey. Many of the developments in survey instrumentation and techniques that had come in during the 35 years prior to the war were now put to good use. From the late 1870s the British Army

had been experimenting with balloon photography and in 1890 a Balloon Section RE was introduced. Just after the turn of the century Buffalo Bill Cody was supplying man-lifting kites for acquiring air photography. By the same time wireless telegraphy was developing and by 1910 messages could be sent a quarter of a mile. The development of these and other equipment by 1914 was further boosted by the onset of war.

The reader is taken through these and the development of flash spotting and sound ranging techniques but in particular there was a need for the rapid reproduction of accurate maps and their distribution by the thousand. How this was achieved is well chronicled

The War as a whole can be subdivided according to the various notable battles and that is used here so that one is led through the development and movement of the prime battle scenes. For those of us too young to recall that war and who have read little about it before, this brings out the famous names such as the Somme, Ypres, Hindenburg Line, Arras, Messines, Cambrai and others and supplies an excellent insight into how it all progressed. With successive chapters so unfolds the growing list of difficulties and triumphs. During 1915 we see that the 1:10 000 trench map of the Army front had to be compiled from cadastral maps and air photos. As soon as the compilation was complete the sheets were rushed to Southampton for reproduction. The resulting sheets could then form the basis on which to fix the British batteries and the German targets; a task achieved by a variety of techniques- trigonometrically using theodolites, by plane table or by measurement from map detail.

It examines all the different Sections, Companies and Groups involved in survey and the interaction and cooperation between the sappers and the gunners. The whole goes to ably demonstrate the truth of Napoleon's dictum that "a map is a weapon of war".

When this volume first arrived the thought was "how on earth am I going to wade through all this?" But as I started so the interest in the

techniques and their developments caught me and rather like a good novel it was a case of what will happen next, so the page was turned, and the next and so on. I am not by any means saying that I read it from cover to cover as I did not but the flavour was much to my liking and a considerable amount of very useful material is held here for future reference.

That is how this volume is most likely to be perceived and used - as a major reference work for both the military and survey aspects. In a way that is a pity since it could well be appealing as more than just for reference but at £50 it is perhaps beyond the general reader and more for the specialist or enthusiast. As a definitive record it can have no competitors and is a must for purchase.

A section towards the end contains 19 figures and 22 black and white plates.

If one has to be at all critical then a minor comment would be that thought could have been given to collecting all the various lists and tables, at present scattered through the book, into appendices. This might also have been contemplated with the reference lists at the end of each chapter which mostly run to over 100 entries each time. This would have left the narrative to run even more smoothly but it is appreciated that these are always areas where authors are torn between what they and what the readers might find the best approach.

With what must be around half a million words the overall presentation of the volume is excellent with no unnecessary frills. The bibliography runs to 6ff pages and the list of abbreviations to 2ff pages. The author is to be congratulated on the monumental effort that must have gone into the compilation and the end result should feature on the next birthday or Christmas present list of any self-respecting land surveyor (or geomatician).

JR Smith

As I read this remarkable account of "survey" (in its widest military sense) in World War One, my mind kept being triggered by interactions with my own knowledge and experience. So I have set these down: maybe others will react in the same way.

T.E. Lawrence crops up on page 12. I had no idea of his survey work in the War Office in 1914 on Sinai which led him to Cairo and on.

Using electric torches to read the sighting system (p 21) at night was no different to how my gunners did it in 1944 (we even used candles!). Our dial sights had been designed for proper illumination. Why didn't we have it? In 1950 I was in the Ministry of Supply responsible, inter alia, for them. I get the wartime file and find that, as an economy measure, the illumination kits were not to be provided (for the loss of a nail the battle was lost?). Who had signed this minute? A major who was now my general. I get a kit designed which goes into service. Air burst ranging comes into vogue (p 37). In 1942 my flash spotting troop (1st FSp Tp, 1st FSp Bty, 1st Svy Regt) had two sections - one for flash spotting, one for air burst ranging. When we arrived in Egypt we calibrated guns outside Cairo using it. I had never realised where the term "romer" came from when I used this device to plot co-ordinates. Now I know (pp 37 & 230) that it was invented by Carrol Romer, an engineer.

To get sound ranging going Bragg recruited eight other members of Rutherford's research team at Manchester (p98). They included A.S. Russell who becomes OC "T" Section (p 146); he was my chemistry tutor at Oxford just before WW2.

In my father's papers (he was in the Royal Garrison Artillery and in France in 1916) there is a 1:10,000 trench map, Sheet 57 D SE4 Edition 2B GSGS 3062 27 Apr 16 printed by Ordnance Survey (p 122 for the Sep 15 edition and P 189 for my father's). It is canvas-backed paper still to scale to about 5%. This has the German trenches overprinted in red but not the British ones (how did you find your way?). It represents the sector of the Somme that my father was in with Becourt Wood (his gun position and Hemming's OP (p127) when

Hemming was in an 18-pdr bty before becoming the leading flash spotter) before moving to Bazentin le Petit Wood to support the attack on High Wood (p 202). He then came home to take a battery to Salonika. His map shows La Boisselle where Salmon's survey is described (pp 120-1). The map also shows, in red, German gun positions with identifying numbers. When the sound rangers want to locate a long-range gun at 20,000 yards they use a cluster system like HALO (p 145).

The flash spotters and others need good OPs and a weatherproof plotting centre. The OPs could be built by the sappers (but not always when wanted): by 1918 the FSB had a carpenter in Battalion HQ (p 420). In 1941, 1st Survey Regiment had two carpenters in RHQ in case we needed to build OPs. The plotting centre etc was often an Armstrong hut (pp 207, 353 & 407). The Armstrong hut came in sections, designed by a Major

Armstrong. In 1916, when conscription started, my great uncle, Sir John Jackson (a civil engineer), volunteered to erect the camps needed for them at cost price. He used Armstrong huts. One of these camps was at Larkhill: he built a spur off the railway to get them there. In WW2 I worked in these huts. The last one I have seen was at Shamley Green but it is gone now. The British CB was so successful that the Germans gave up their protected positions and went over to alternative ones, decoy guns and dummy positions (p 218).

The book dwells on the chaotic state of the basic trig and the useless pre-war French maps. Great efforts are made to improve all this. But the British and French use different projections, map sheets etc and this isn't resolved (pp 409 & 438). We have had a talk on Bosnia mapping - nothing changes.

Two final *cri de coeurs*: firstly, I was most impressed by the amount of material used which was not from official sources (pp 541-3). I am sure that, for current and past campaigns and operations we should be collecting and preserving all such. Secondly, physicists (and other university graduates) were collected from a wide variety of sources. One, Tucker, proposed the vital hot wire microphone which made sound ranging feasible (p 76). The FSA was set up, in 1927, to have a pool of people interested in case of war. I think that we should have a locating cell at a university - you never know what might crop up. You can see that I have found this book a real source of inspiration - others should too. And there are many lessons to learn.

Fraser Scott (nicknamed Aristotle by the Leicestershire Yeomanry)

REQUESTS FOR INFORMATION

SURVEY MATERIAL UP TO 1945

Peter Chasseaud is researching for a doctorate in comparative 20th Century military survey and mapping, with particular reference to the period up to 1945. He would especially appreciate information, references and sources relating to France, Germany, Russia and Austria-Hungary, but is also looking for material from other countries. Likewise, if you have any old maps or obsolete survey material of this period which you are willing to give, sell or lend for photocopying or scanning, please get in touch. Finally, he is still looking for British survey and mapping material for the period up to 1945.

Address: 17, St Anne's Crescent, Lewes, East Sussex, BN7 1SB

Telephone: 01273 476265 or e-mail: peter@parvenupress.freemove.co.uk

ROYAL ARTILLERY SURVEY REGIMENTS DURING THE SECOND WORLD WAR

Massimo Mangilli-Climpson, lecturer at the University of Venice, is involved in a long-term research project on the history of the Survey Regiments, RA, during the Second World War. He would appreciate anyone in possession of documentation or memories of their wartime service in such units contacting him at:

The Victory Services Club, 63 - 79 Seymour Street, London W2 2HF

Telephone: 0171 723 4474 or Fax 0171 724 1134

HISTORY OF THE CORPS OF ROYAL ENGINEERS 1980 - 2000

Work has started on producing the official history of the Corps of Royal Engineers for the years 1980 to 2000 with Major Robin Lewin responsible for collating the Military Survey. He is keen to contact anyone wishing to pass on information, anecdotes or photographs that may be pertinent to the history. He can be contacted by telephone on: 01635 253149 or by e-mail: lewin.greystones@ukgateway.net.

BOOK REVIEW: EVEREST

Everest: The Man and the Mountain JR Smith 1999 306 pages. £37.50 ISBN 1-870325-72-9

Published by Whittles Publishing, Roseleigh House, Latheronwheel, Caithness, Scotland. KW5 6DW

It has to be said that this is probably not a book for the layman as it assumes a reasonable level of professional knowledge from the very first moment. It is apparent very early on that you cannot tell the story of George Everest without also telling the story of the Great Trigonometrical Survey in equal, and some technical, detail. Having said that, it's a very good read and is without doubt, now the definitive work on Colonel Sir George Everest.

The book is divided into three parts, the first is the story of George Everest the man, the second is a miscellany of associated information and the third covers Everest the mountain. As soon as you start the third part you realise that it is really two separate books and you have received one of those supermarket bargains; 'you bought one and got one free!' There are also five appendices that will appeal particularly to those with an interest in the details of the instrumentation and geodetic solutions of the time. Part 2 might have been better included as appendices rather than a stand-alone part.

The whole is laid out very well with copious bold paragraph headings; "Closing the gap to Sironj", "The arc across the Doab", "Fever Again", "May I have a CB please?" and so on, which almost tell the story in précis form. Extensive use is made of quotations from a variety of sources, all of which are clearly referenced.

'Everest' is a word that everyone knows but, in the main, only surveyors and geographers relate it to a man rather than the mountain and even they tend to know little of him. The more you get into this book, the more you are amazed at the man and his achievements

As VK Nagar, Surveyor General of India, says in the forward; "...he was a great genius". However, as with most great genius, I'm not sure that I would have wished to serve under him. He certainly had more hours in his day than mere mortals do for he was intensely involved in the minutiae of all aspects of surveying in India. He evolved the theoretical answers to the problems of surveying the Great Arc as they arose, then devised practical procedures to implement the theory so that, often untrained, people could carry out the work and even designed or improved the instruments that they used. He appears to have reseed the majority of the route virtually single handed, planned and supervised the building of hundreds of observing towers, organised the vast logistic support necessary and, at the same time, administered the Survey of India to the point of detailing the dress of his local computing staff down to "shiny black shoes". All this and, he carried out a vast number of the observations himself.

He was a Gunner who went to India at the age of sixteen and appears to have become involved by accident with surveying based on his incredible mathematical ability, which was self-taught. Throughout his time in India he was repeatedly racked with bouts of fever, at times being carried to the instrument and supported by staff whilst he made the observations. From today's point of view, being bled by 1000 leeches certainly didn't help! He was twice sent from India to regain his health and on each occasion he carried on his research and computations during the long convalescence.

The book clearly shows him to be, in modern terms, a 'workaholic' and someone who was 'at the very cutting edge of the technology' of the time. He appears dedicated to the point of obsession as far as accuracy was concerned. It is clear that he was very demanding, if not actually difficult, to work for. Any subordinate who did not achieve and

maintain Everest's own standards was soon told of his shortcomings, often in writing, in no uncertain terms. At times he comes over as a martinet; in the field ordering that all animals are to be silent and not disturb his sleep or standing on his dignity with other colonial officials. He was a man who knew his worth, as shown by his request for a CB, and who stood as an equal with the great surveyors and scientists of the day; Colby, Airy, Beaufort, Faraday et al.

There are few glimpses of him as a person as records have not survived. We see him once as a frivolous young man when he describes rolling huge boulders down mountainsides to alleviate boredom. His dealings with the local populous, and the native staff in particular, was courteous and caring and probably far ahead of his time. After 37 years of incredibly hard work in often appalling conditions whilst frequently suffering from debilitating illness he returned to England, married Emma, who was 33 years his junior, and fathered six children. This seems so at odds with the person that we came to know in India.

Part 3: The Mountain, is a brief history of obtaining the successively more accurate heights for the mountain and the controversial matter of its name. This again makes interesting reading but is almost an aside after the epic story of Sir George and the Great Trigonometrical Survey, especially as the man never set eyes on the mountain!

All in all a very good read that left me with the feeling that the man deserved to have the world's highest mountain bear his name and what a shame he wasn't a Sapper!

AG

Raising the tempo...



STRIKE

MANOEUVRE



DEPLOYMENT



Be it Strike, Manoeuvre or Deployment, ESRI (UK) are supporting Military capability by helping our customers to:

- Visualise Terrain
- Achieve Information Superiority
- Read all Military formats 'Off the shelf'
- Improve Command and Control

For further information look at our web site or contact us quoting Ref: M2.

ESRI (UK)



ESRI (UK) Ltd, Pebble House, Parsons Fee, Aylesbury, Buckinghamshire HP20 2QZ
e-mail: info@esriuk.com
Tel: 01296 745500 Fax: 01296 745544
<http://www.esriuk.com>