THE RANGER

Journal of the Defence Surveyors' Association

Autumn 2001 edition

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HMS Beagle off Sierra Leone

Defence Surveyors' Association

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Contents - Autumn 2001

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Cover photograph: HMS Beagle carrying out operational surveying off Freetown, Sierra Leone.
Photograph: Leading Photographer Susan Rose, Survey Squadron Photographer.

This edition of Ranger...

As I put together this issue of the Ranger, the military actions in response to the awful events of the 11th of September have been unfolding for several weeks. Whilst the state of the world by the time you read this is anyone's guess, one thing is very certain....the 'backroom boys' in defence geomatics have been very busy.

It is truly amazing that within only a few short years the world now comes to expect missiles that are launched from under the sea hundreds of miles from their target and, bombs dropped by aircraft flying at supersonic speed through heavy anti-aircraft fire to achieve absolute pinpoint accuracy. The well-aimed bomb will demolish the walls of a barracks but a miss of only 100 metres hitting a so-called humanitarian target will rock the very foundations of the political coalition necessary to pursue the conflict...accurate 'survey data' has never been so vital!

It was very noticeable when walking around the recent GIS 2001 exhibition at Earls Court, how many former Defence geomatics personnel are now doing very nicely in the commercial sector. Good technical training, sound management experience and the self-confidence that these breed has proved to be good career builders in any sphere.

This edition seems to have taken on a distinctly nautical flavour with articles looking at the top level reorganisation, the upgrading of the UK's Hydrographic capability with two new ships and systems at sea and the major Vision 2000 Flowline Project at the Hydrographic Office in Taunton.

42 Engineer Regiment (Geo) have provided an update of the their operational deployments to the Balkans and Sierra Leone, using the words of Geographic Technicians in theatre to give a feel of grass roots geographic support. Staying with the technicians, the citation for the Straeter Prize confirms yet again that the technician soldiers and sailors are as good as ever. Articles on survey support to the Royal Artillery during the 1943 Sicily landings and surveying in the Aden Protectorate in the 1960s remind us that each generation of 'Defence Surveyors' has served through troubled times.

Slowly but surely, across several decades, all the major Military Survey/DGIA moves and rebuilds have been implemented...the School was rebuilt, the Regiment moved, Hotine Building came to fruition, the Map Depot is now at Feltham. Ron Shepcar's article on 'Moving the Earth' outlines the plans for the final piece of the jigsaw...at last the MOD Map Library will leave its wartime huts at Tolworth for purpose-built facilities at Feltham.

I cannot finish this editorial without mention of the superb quality of the last edition of Ranger. The staff of AIDU are to be complimented on the production of what is now a 'quality' journal rather than one which is merely 'fit for purpose'...well done and thank you.

Once again, I hope you enjoy a good read.

Alan Gordon

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Opinions expressed in Ranger do not necessarily reflect those of the DSA or the editor.

DEFENCE SURVEYORS' ASSOCIATION

Formerly the Field Survey Association

The Defence Surveyors' Association, or DSA, is a registered charity whose principal objectives are:

- To maintain a permanent liaison between serving officers, retired officers and civilians working in the Defence domain who have a professional interest in geospatial data.
- To keep abreast of current issues in the geomatics arena.
- To recognise the most significant contributions to geomatics by serving personnel through the award of annual prizes.

The Association publishes the Ranger journal on a periodic basis and organises various technical visits and social events for its members. These meetings provide an ideal opportunity to meet a wide range of people, all of whom have a connection with some aspect of the geomatics profession.

The Council of the Association is currently widening its membership and improving its services to members. *If you want to keep in touch with the survey profession and friends in the business please come and join us.*

Membership is open to personnel who are engaged, or have been engaged, in Defence related geomatic disciplines at a management level. In addition, 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 suitable for 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 Membership Secretary on 01730 823638 or e-mail: membership@defencesurveyorsassociation.org

BEREAVEMENTS

It is with regret that the association announces the deaths of the following members: Brigadier Lew Harris, Major Sid Hellings and Major Tim O'Brien. Obituaries appear in this issue of Ranger.

Although not DSA members, the deaths of John Wright, well-known in surveying circles and a former Deputy Director (Surveys) with DOS and Dr Thomas Leslie Thomas, who was involved in the development of the Precision Meridian Indicator (PIM) when he was Reader at Imperial College, will be sad news to many members.

REQUEST TO ON-LINE MEMBERS

There would be considerable savings to the Association in terms of postal charges and stationery costs, let alone providing a speedier delivery service, if e-mail was used wherever possible for correspondence.

Members with an e-mail facility are therefore requested to inform the Secretary; secretary@defencesurveyorsassociation.org and the Treasurer; treasurer@defencesurveyorsassociation.org of their e-mail address so that we can realise the savings and provide a quicker service.

DSA CHAIRMAN'S REPORT 2001

At the AGM on 16th June 2001 at Woolwich, the following report was presented more informally by means of a series of Powerpoint slides and the use of a PC and a projector. I believe the following represents an accurate transcript of my presentation.

Introduction

Last year, on the 24th of June, in this very location at Woolwich, I gave you a somewhat lengthy report believing it to be my last at the end of a two-year tenure. However, it was not to be, and at members' request I agreed to continue for a further two years until a successor could be found who would undertake the obligatory one-year period as Vice-Chairman and lead-in to the Chair.

I, therefore, now offer you my annual report at the end of the first year of my second two-year tenure. Colonel (Retd) John Croft, has been elected to take over from me next year in 2002, and he is now firmly in post as the Vice-Chairman; whilst carrying out the time consuming Membership Secretary's duties for which I thank him.

DSA Background, History & Ground Rules

For the benefit of new members and as a reminder to others I would like to set the scene and conditions under which the DSA has to operate. I do this because some of us forget, sometimes conveniently, *how* the Association can change and evolve, in this ever increasing commercially driven and high tech' world. As a part of those aspirations, to move with the times, we still have to meet our *existing* member's expectations and satisfy the current, accepted rationale for the DSA's existence.

In brief, the Association was founded in 1927 and has changed it's name twice, now, to reflect the activities of our professional members in the Defence arena. The DSA is a charitable organisation and, as a consequence, is governed by the UK Government rules of the day. In general terms, this means:

- We are not established for profit or gain but for the benefits of others.
- Under current tax rules, members can covenant their subscriptions and claim tax relief.
- The Articles of the Association, re-written in 1997, are under constant review to ensure we continue to meet the Government's guidelines.

Purpose, Aim and Objectives

The purpose of the DSA, in essence, is to promote and sustain those Defence organisations engaged in all aspects of surveying, mapping and charting by maintaining a permanent liaison between serving officers, retired officers and civilians.

My aim and objectives continue to be focussed on increasing the membership and sustaining the purpose and rationale of the DSA by improving its image and visibility and the benefits to members, whilst maintaining our financial stability.

Constraints, Hurdles and Consequences

The Executive Members of the Council are volunteers and unpaid with their own business and domestic commitments. Hence, progress may not be as fast as members would like it to be. On the good side, however, it does make us focus our attention on short-term achievable goals.

Without drawing down on our investments, which provide regular dividend income, there is always a continuous book balancing exercise to ensure a positive cash flow, particularly as our accounts have become more complex. Our annual revenue and expenditure has nearly doubled over the last two years! In addition, all expenditure has to be tempered against risks and rewards whilst maintaining a constant eye on our operating costs to keep them as low as possible.

I continue to remain concerned over the lack of membership feedback and low attendance at events and I would welcome comments and explanations from any of you as to why this should be. As an example, the majority of our events attract some 20-25 members (plus partners) which I consider to be a low representation notwithstanding the fact that travelling difficulties and distance tend to deter or prevent our more senior members attending.

Achievements & Successes

In spite of the difficulties above, we have had a number of successes this year.

- The Ranger continues to go from strength to strength with improvements in quality and content whilst increasing the circulation and decreasing publishing costs. For this I thank Alan Gordon together with our commercial sponsors, advertisers and printers who help keep our net production and distribution costs down.

- The Web Site is now up and running (www.defencesurveyorsassociation.org) thanks to our Webmaster (and Hon Treasurer) Robert Dobbie together with the designer Jonathan Rouse. This electronic communications site improves the DSA's visibility and moves it into 21st Century. It offers an improved communication facility via email to executive members of Council together with hyperlinks to other sites with whom the DSA has some professional links or synergy. Unlike hardcopy publications and circulars, it provides an easier, quicker and cheaper means to subscribe and publish up-to-date news. It is hoped that a sponsor for this web site will be found before the end of the year.

- The design and printing of our marketing posters is now complete and they are now displayed on all the appropriate unit and establishment notice boards in order to, hopefully, attract new members.

- On the social side, we have held four events in the last 12 months together with some very active participation in a Military Mapping Seminar at Greenwich University. The four social events have been held, at the Science Museum Wroughton, RM Museum Southsea, DISC Chicksands and RA Firepower Woolwich.

As a consequence of all this, we continue to have annual net increases in our membership with a slightly better mix of membership age and professional backgrounds. This mix has, undoubtedly, been improved by our collaboration, and the holding of joint events, with members of the Medmenham Club which has followed on the heels of the amalgamation of Military Survey and JARIC into the DGIA.

Failures

Whilst we cannot do everything, for the resource reasons explained earlier, I still regret that we have not yet achieved the following and I will be concentrating on these over the next 12 months. In no particular order, I believe we have failed to:

- Increase our MOD/Unit on-site representation, in order to promote and encourage further membership.

- Improve the nature and locations of our events to encourage an increase in attendance.

- Improve the focus in our recruitment efforts.

- Improve the means of membership feedback.

- Radically improve membership benefits and value for money (even if this results in an increase in annual membership fees).

- Investigate the, relatively, low interest shown by 'young blood' and take corrective action.

If any member believes they can help us achieve any of these objectives please contact the Hon Sec, David Wallis or myself.

Lessons Learnt

During my three years in post, I think the major lesson I have learnt is not to be over ambitious with objectives and not to have too high expectations of Committee members who are giving up their valuable time. I have therefore learnt to concentrate on those actions which can give maximum benefits to the Association, in the shortest possible time with the lowest risks and costs.

I have also learnt that we can always do more with help from members to assist with ad hoc tasks. To therefore re-iterate my request above, I would encourage members to offer their assistance so that we can establish a resource 'pool' from which we can draw when help is needed.

Some Way Forward Considerations

In order to overcome and achieve the failures (and continuing aspirations) above, some of the considerations that I will be placing before Council at the next meeting are:

- Improvement of web site by:
  - Increasing number of hyperlinks
  - Developing a 'where are you now' site
  - Developing a commercial opportunities/recruitment site
  - Developing a web site comment/improvement facility
  - Obtaining sponsorship
  - Updating and enhancing the site into IM&GE and/or business and technical practices to reflect Intelligence, Surveillance, Target Acquisition and Reconnaissance activities.
- Publish a supplementary bi-monthly News Sheet to the Ranger.
- Undertake a mail shot market survey of non-members and members to ascertain reasons for apparent lack of interest in some quarters, with the aim of improving membership numbers and mix.
- Investigate links/liaison with the AGI as Defence Special Interest Group and other similar organisations.
- Arrange or sponsor technical seminars.

Mike Stanbridge
Chairman DSA
June 2001

TREASURERS REPORT TO THE AGM, 16 JUNE 2001

The Association has had a good year. When I took over as Treasurer five years ago we had a somnolent account for a somnolent Association. In five years, activity in the account has doubled; a clear indication that the Association is growing healthily. Our Charifund Securities have done well this year in spite of the market trend and changes in taxation. I have recommended to Council that our investments remain with M & G Charifund.

The big item of expenditure has been production of our RANGER magazine which is a great flagship for the Association. We hope to attract more advertisers and sponsors in future years. The new item of expenditure is the DSA Website. We hope that this will provide a useful link for members as well as advertising the Association and its activities. We are seeking a Sponsor.

The Council considered raising subscriptions, but decided that this would not be necessary provided that Gift Aid could be used to maximise the Association's subscription income by making each £10 worth £12.80.

On your behalf, the Council has just presented HMS Herald with £1,000 towards the cost of producing their decommissioning book.

Robert Dobbie, Honorary Treasurer

THE DSA WEBSITE

www.defencesurveyorsassociation.org

By Robert Dobbie

The Council decided that we should invest in a simple website to publicise the Association and keep members in closer touch with our activities. A Member should be able to 'Log On' to check for news and see what events are planned well in advance of getting the invitation which is usually sent out about 6 weeks before an event.

We gave an outline specification to the designer and set him three goals:

1. The site was to be written in well structured HTML which was to be the intellectual property of DSA.

2. Only the simple constructs in the language were to be used so we could maintain our own site.

3. The site should be simple and intuitive to use.

The contract was won, and the development work done by Jon Rouse at Leicester University under the direction of myself - the Webmaster designate! Jon set up the site with EasyNet, wrote the HTML and has provided an Operating Manual to guide the Webmaster. The Association moves fairly slowly, but the Webmaster intends to try and put significant new material on the site about once a month.

The site went live on 1 June 2001 and was demonstrated at the AGM on the 16th of June 2001.

If you have a computer connected to the Internet you can just 'Log On' to the DSA address given in the title above. If you don't have access to an Internet connection, you can usually 'Log On' at the local library where there is plenty of help. In Surrey, and many other authorities, this facility is provided free.

Each page on the site is divided into three parts:

1. The Index is down the left side below our logo - to get to a particular page just click on the subject.

2. The top panel, to the right of the logo, gives the title of the current page and sometimes includes 'flags' for jumping straight to a particular heading within the page.

3. The main body of text on the page selected which occupies most of the screen.

If you meet anyone who is interested in joining the Association, or would just like to attend one of our events, you can direct him or her to the Website for information. There is also a facility for sending a message to some of the Council directly from the site. As Webmaster, I welcome comments and suggestions. Also, if you have news that is of general interest to other members, please send it to me and I will put it up for visitors to read.

Finally, please contact me if you or your company would be interested in sponsoring the site.

Robert Dobbie, Webmaster webmaster@defencesurveyorsassociation.org

PS TO THE GENERAL'S JOLLY

Ardent 'cartoholics' will recall the map margin note "Users noting errors or omissions...." which hopefully seldom brought a response. Ranger, in line with most publications, does not invite its readers to point out the error of its ways. However, a glaring omission in the spring edition needs to be put right. Gremlins swallowed the final sentence of Roy Wood's excellent article describing the scaling of Kilimanjaro by three former Director Generals of Military Survey. Here is the complete final paragraph.....

It was a tremendous trip with all of us reaching the summit and enjoying an excellent week on the mountain. We suspect that this is the first time that three members of the DSA have reached that height together and it also seems possible that we achieved an altitude record for a party including three Major Generals. However, we are quite sure that this represents an absolute record for DGs of Military Survey setting a common policy and actually managing to carry it out.

With apologies: *Editor*

NEW MEMBERS

The Association welcomes the following new members and hopes to see them at an event in the near future.

Mrs RF Adams BSc, MRICS. Following a degree in surveying sciences, Ruth has served for the last ten years in the Hydrographic Office at Taunton, working mainly in geodesy.

Wing Commander G Barber RAF. As OC Air Information Documentation Unit RAF, Gary is responsible for the production of the wide range of navigational graphics and datasets necessary to support flight safety.

Mr M Barnes MRICS, MInstCES, MioD, MRIN, FRGS. Michael started military life as a Royal Marine Officer but transferred to Military Survey where he served for eleven years. On joining GPS Survey Services as a founder member and then held managerial positions in a number of survey companies. He is currently a Vice President of Thales Geosolutions Group and is based in the USA.

Mr C Brigden FRGS. Previously a member and the Secretary of the FSA, Clifford has joined/rejoined the DSA. Originally with a background in Military Intelligence when he focussed on the SW Pacific Region, he has recently completed studies at Cambridge University in radio astronomy and satellite imagery. Now he is at Jodrell Bank where he is involved with exo-planetary topographic studies.

Dr A Cook MA, PhD. Andrew is the map archivist for the India Office Records at the British Library. He has specialised in the past in the histories of the East India Company, the Indian Hydrographic Survey and The Survey of India including their involvement in military mapping and charting on the sub-continent and beyond its shores.

Mr JW Fitch FRGS. On completion of his field survey course at SMS in 1953 James spent three years in the Malayan jungle with a field survey section working closely with the SAS. He joined Huntings Surveys Ltd in 1956 and worked with the Geodetic Survey of Saudi Arabia 1966-80. He was the Superintendent Survey Manager of the Arabian Aerosurvey Co from 1980 until he retired in 1990.

Mr G McI Harper. George has spent his entire working life in the survey sector. As a young man he served with 13 Field Survey Squadron RE at Fernhurst Camp before moving to the commercial world later becoming Defence Sales Manager with Leica where he worked mainly to meet the needs of the Royal Artillery.

Mr C Japp BA (Hons), MSc. A former RAF Operations Officer for several tactical and strategic imagery programmes, Cameron now manages the Infoterra Defence Division. He has spent 10 years in the geographic information industry, working internationally as consultant and business manager for both defence and environmental clients.

Mr AR Johnson BSc (Hons). Andrew spent twelve years working in the commercial offshore survey sector before taking up an appointment with the Hydrographic Office at Taunton where he is now working as a geodesist.

Mr J Money. Having spent 26 years with Military Survey, where he specialised in digital Photogrammetry, John joined BAE Systems Mission Systems where he provides project management and technical support for their UK operations.

Dr I Mumford BSc Econ, PhD, FRGS, FBCartS. As a Gunner Captain, Ian served most of his time in the Second World War in the Royal Indian Artillery in Burma and India. After the war he worked as a map research officer with Military Survey for 33 years, his final appointment being that of BLO in Washington (1981-85) as a PMRO. From there he became a reviewer of records with the MOD (1985-95) and has since become a consultant working on the India Office Collection in the British Library.

Mr S Mumford. Steve served a full career with Military Survey, latterly much involved with the new generation of systems introduced following the Gulf War. He is now a Project Manager with a major IT company, currently working at GCHQ at Cheltenham.

Commander VA Nail RN. Vaughan is currently serving as Commander (H) having recently moved from the Intregated Project Team building the new Hydrographic Surveying Ships. Among his previous appointments after his RN Basic and Long Hydrographic courses were command of HMS Beagle (1993-94) and Executive Officer on HMS Scott (1996-98).

Lieutenant Colonel CGA Nash. Chris spent 25 years in Military Survey during which time he served in a variety of appointments including OC 13 Map Production Squadron RE and staff posts with MOD UK, NATO and the UN. He is now a director with Turner FM, a major facilities management company.

Mr C Nicklin. After 14 years in Military Survey, Cliff joined the Cambridgeshire Police where he later specialised in GIS, becoming the Police Authority GIS manager. He has been seconded to APSO to coordinate the use of GIS and in this role sits on several mapping-related committees.

Major SJ Pyatt. Steve was a member of Military Survey from 1987 to 1997. He served in 13 Squadron and was in turn OC of 1 Air Survey Liaison Section RE and of 19 Topographic Squadron before becoming Chief of Staff of 42 Survey Engineer Group. He is now Assistant Director Geographic Information in the New Zealand Defence Force.

Mr I Rudd BSc. Ian worked in the MCE RE as a cartographer (1968-82) and, on leaving, he gained his BSc in Computer Science at Kingston. Building up his experience in a number of IT jobs he went into GIS, specialising in business development and sales.

Mr CJ Skinner BA(Hons). Chris is Business Development Manager for BAE Systems (Combat and Radar Systems). Through his work he has, for a number of years, had strong links with the Defence Community, the RN in general and the Hydrographic Service in particular.

Mr MJ Stokes. As a young 2nd Lieutenant, Jeremy served with 156 Locating Battery RA in Osnabruck in the 50's and then at Woolwich. On retirement from the Regular Army he went into building and quantity surveying but retained his military links as a member of G Locating Battery of the Honourable Artillery Company. He was a Pikeman on ceremonial duties in London whilst with the Battery.

PIG AND WHISTLE AND THE LIKE

By Donald Ensom

The usual high standards of the Ranger appear to have slipped in the description of the origins of the phrase "Pig & Whistle". This expression was unknown to me in gunner survey in my time but seems to be a corruption by others (no names, no pack drill) of the name of a very useful piece of Royal Artillery survey equipment, namely the Pegan Weasel. As I doubt many of the readers of the journal will have heard of this, I will explain.

The popular song "Pop Goes the Weasel" indicates that apart from being a four legged creature, a weasel is a hatter's iron, used to smooth the brims of felt hats I assume. Thus the song title reference is to a hatter pawning his iron to buy strong drink.

It is a well known fact that the map maker, either deliberately or by sheer incompetence, ensured that when gunners required a map of a particular area of country the area was always on the corners of four adjacent printed map sheets, the required centre being at the function of all four. (Computers have changed this I believe but not in my day).

To overcome this problem all RA survey units were issued with a supply of "Tape Adhesive, Maps for the Joining of - Mark II" together with one or more Pegan Weasels (G1098 number 01.04). An adaptation of the hatter's weasel by a Captain Pegan, this was a small electric iron, run off 12 volt batteries and used to join the four required sheets by hot ironing the adhesive tape onto the back. Mark I tape needed to be licked and was found unsatisfactory in desert warfare as water supplies were insufficient to provide the gunners with enough lick.

Pigs and pieces of string indeed!

Donald Ensom

HYDROGRAPHIC SURVEYING SQUADRON ROUND UP - January to August 2001

By Lieutenant Commander Jeremy Churcher RN

The first half of 2001has been a challenging period for the Hydrographic Surveying Squadron (HSS), with ships deployed to the Persian Gulf, Indian Ocean, West Africa and the Antarctic. HMS *Herald* and HMS *Bulldog* have paid off, whilst the construction of the two new *Echo* class 'Survey Vessel Hydrographic/Oceanographic' (SVHO) ships is on track to meet planned in-service dates in 2002/3. A wide range of survey and exercise tasking has been undertaken, ranging from routine defence and civil hydrographic programme (DHP and CHP) surveys in UK waters and abroad to short-notice operations in Oman and Sierra Leone.

HMS *Endurance* returned from her annual South Atlantic deployment in early May, after a busy and highly successful season surveying and providing support to the British Antarctic Survey (BAS) and Foreign & Commonwealth Office (FCO) during the austral summer. Highlights of the deployment included an officer exchange with the Argentine Navy and a high profile visit to Panama on the homeward passage. Meanwhile HMS *Scott* continued her deep water tasking in the Indian and North Atlantic Oceans, prior to completing a maintenance period in Gibraltar between April and June. Whilst there, the ship conducted a large scale survey of critical areas of the harbour using the Queen's Harbourmaster's launch, which provided valuable experience for a survey department more used to extended periods at sea surveying the ocean depths. Scott is due to return briefly to Devonport in October, her first visit to her nominal Base Port in 15 months!

HMS *Herald* spent the first 3 months of the year gathering oceanographic and bathymetric data in the Eastern Mediterranean. She returned to Devonport, flying her paying off pennant, on 12 April and finally decommissioned in Portsmouth at the end of May. The last of the four *Hecla* class Ocean Survey Ships (OSS) that, together with the four *Bulldog* class Coastal Survey Vessels (CSV), were the work-horses of the Royal Navy's Hydrographic Surveying Service over nearly four decades, *Herald* was commissioned in 1974 and had an eventful and varied life, seeing service as a hospital ship during the Falklands Campaign in 1982 and as the Mine Countermeasures Command Platform during Operations SIMNEL and GRANBY in the Persian Gulf in 1988-90. The second HSS ship to pay off this year was HMS *Bulldog*. Deploying from Devonport in January, she spent several months conducting hydrographic surveys in the Gulf before returning via the Gulf of Masirah, where she completed vital short-notice reconnaissance surveys as a precursor to Exercise SAIF SAREEA II, the major UK-Oman exercise due to take place later this year. Regrettably a multi-national survey exercise scheduled to take place in the Adriatic was cancelled at the last minute, so the ship was diverted to spend her last weeks at sea surveying in the Irish Sea before making her final entry into Devonport on 6 July. *Bulldog* paid off at the end of August, after 33 years distinguished service, and was privileged to have the First Sea Lord, Admiral Sir Nigel Essenhigh, as Guest of Honour at her Decommissioning Ceremony in Devonport.

HMS Endurance and Lynx

In the first 6 months of 2001 HMS *Beagle* has maintained a punishing work schedule. After completing her final refit and a successful period of Operational Sea Training at the start of the year, the ship was despatched to West Africa in April to conduct short-notice surveys in Sierra Leone in support of Operation SILKMAN. The involvement of UK maritime forces off Sierra Leone during Operation PALLISER in 2000 had highlighted major shortfalls in available charting, which was almost exclusively derived from small scale lead-line surveys and passage observations; navigation marks were found to be non-existent, the river had changed course and there were numerous uncharted wrecks. Whilst much valuable work had been achieved during PALLISER by HM officers employing portable survey equipment and boats of opportunity, the autonomous capability afforded by a specialist survey ship was essential in order to safely exploit key areas of military significance. Working in intense heat and humidity and dodging the numerous local fishermen in small unlit dugouts, extensive surveys were completed by ship and boat of the approaches to Freetown, and of a number of smaller previously uncharted areas of interest. During a logistic stop in Dakar the ship's team cross-pollinated with their US counterparts in USNS *Littlehales*, whilst *Beagle's* visit to Banjul was the first by a RN warship in 7 years. A short visit to the ship by the President of Sierra Leone, who was presented with a bathymetric sheet of 'his' river, marked a fitting conclusion to a demanding deployment.

HMS *Roebuck* has had a taxing, and sometimes frustrating, 6 months. As the first HSS unit to be fitted with an updated survey processing system, replacing the

obsolescent system currently in service, she suffered considerable disruption to her programme whilst numerous software and hardware bugs were evicted and the surveyors familiarised themselves with the system. The first quarter was spent conducting hydrographic surveys in the Irish Sea, during which the ship visited Brest, where she was joined by Captain H (Captain M K Barritt) as part of on-going and valuable liaison with the French Naval Hydrographic Service. In June, *Roebuck* transferred from current to contingent tasking, conducting Rapid Environmental Assessment (REA) operations as part of a Joint Maritime Course (JMC) exercise off the west coast of Scotland. This was a highly successful period, with major progress achieved in the truly rapid gathering, processing, fusion and transmission of disparate environmental data sets, so validating and demonstrating key national REA concepts. This work will now be taken forward into Exercise SAIF SAREEA II later this year, in which *Roebuck* will play a central role.

HMS Herald enters Devonport

The two new SVHOs, HMS *Echo* and HMS *Enterprise*, are currently in build. *Echo* is due to enter service in late 2002, and the lead members of the ship's company start to join in the autumn. The ships are substantially larger than the *Hecla* class, will be fitted with state-of-the-art surveying equipment including multibeam echo-sounding (MBES) systems, and be capable of undertaking operations of extended duration. Employing a crew rotation system similar to that proven so successfully in HMS *Scott*, the ships will be fully RN manned and, with the prime contractor (Vosper Thornycroft) retaining responsibility for engineering and logistic support, will be available for operations for up to 334 days a year. To date, MBES experience within the RN Hydrographic Surveying Service has been restricted to HMSML *Gleaner*, which has made outstanding progress over the last year in the trialing and now routine employment of MBES for charting surveys*, with high quality work completed in Devonport and the Channel and, more recently, in the Clyde and the Kyles of Lochalsh. There have been numerous technical and procedural challenges, both for *Gleaner* and the UK Hydrographic Office, but valuable lessons are being learned and the hard work to date should smooth the way for the introduction into service of the new ships.

Last, but by no means least, mention must be made of Naval Parties 1008 and 1016. These two small teams of RN surveyors, conducting CHP surveys in MV *Marine Explorer* and MV *Confidante* respectively, are extremely busy and highly productive. Under contract to the Maritime and Coastguard Agency (MCA), the two parties play a vital role in meeting the UK's international obligations under the International Convention for the Safety of Life at Sea (SOLAS) Convention for the provision of hydrographic services and the promotion of navigational safety. NP 1016 has been working in the inshore and coastal waters of the east and south coasts as part of the annual re-survey programme of the English Channel and its highly mobile seabed and sand banks, whilst NP 1008, after a period working in the Channel separation scheme, is conducting coastal surveys in the Bristol Channel.

The next six months will see little respite for busy HSS ships and units. HMS *Roebuck* and HMS *Beagle* deploy to the Gulf, and HMS *Endurance* to the Antarctic, whilst HMS Scott continues her Ocean Survey Programme tasking, and HMSML *Gleaner* and the Naval Parties take forward the UK survey programme.

* Editor's Note: The DSA RN Prize winner was involved in this work which was reported in the spring 2001 edition of Ranger.

Jeremy Churcher joined the Royal Navy in 1987 and specialised as a Hydrographic Surveyor in 1990. He has enjoyed a varied career within the specialisation, ranging from a period on the staff at Britannia Royal Naval College, Dartmouth through to an appointment as Operations Officer of a Coastal Survey Vessel. His last sea appointment was as Executive Officer of HMS Herald and he is now serving as Staff Warfare Officer (HM) to the Captain of the Hydrographic Surveying Squadron, responsible for contributing to the development of doctrine for Rapid Environmental Assessment and Combat Survey Operations.


Freetown wreck

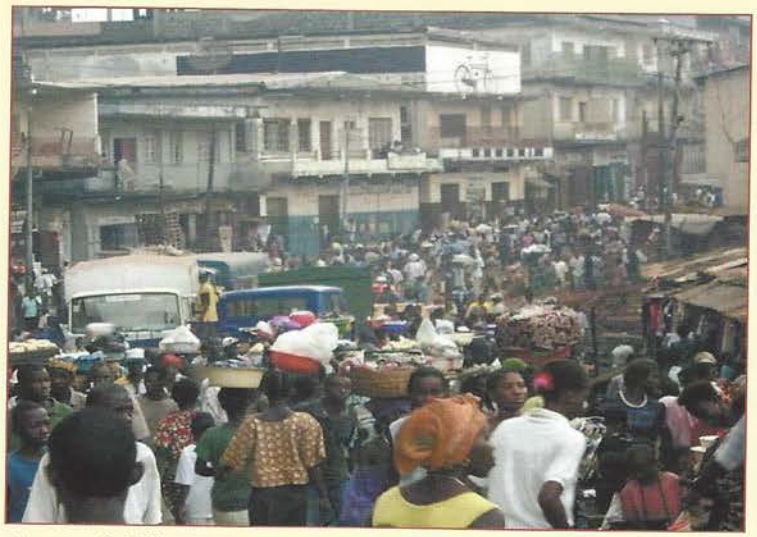
GEOGRAPHIC SUPPORT TO OPERATIONS

By Lieutenant Colonel John Kedar

Commanding Officer, 42 Engineeer Regiment (Geographic)

It is now nearly a year since 42 Engineer Regiment (Geographic) was formed, and six months since I was appointed the Regiment's first Commanding Officer. In that time the Regiment has hardly stood still, except where exercises have been cancelled as a result of Foot and Mouth. The Regiment is forging its own identity despite sitting alongside its superior headquarters and the Royal School of Military Survey, and sits proudly alongside all other Sapper Regiments.

The Regiment is a diverse command. Regimental Headquarters, 13 Geographic Squadron and 16 Geographic Support Squadron are located at Hermitage, 14 Geographic Squadron at Monchengladbach, and 135 Independent Geographic Squadron (Volunteers) at Ewell in south London. We currently have soldiers on operations in Kosovo, Bosnia, Macedonia and Sierra Leone, and a squadron on Exercise SAIF SAREEA in Oman.



Freetown Op Silkman

Overseas travel is not limited to operations. The Regiment has conducted exercises and tasks in Kuwait, Jamaica, Norway, Kenya, USA, France and Cyprus and has seen soldiers in Alaska, Slovenia, Bolivia, Barbados and numerous other countries in ones and twos on sport, adventure training and on exercise. On top of this there is a significant exercise support programme, both in terms of our own training and in deploying geographic troops on ACE Rapid Reaction Corps and Divisional exercises. It has been another significant sporting year too, with the Regiment retaining the Inter-Services major units hockey cup, as well as having successful rugby, soccer and cricket seasons.

The articles below on deployments to Kosovo and Sierra Leone, demonstrate how our operational capability is being used by Defence. I hope also they demonstrate the interesting careers we can offer motivated young men and women.

OP AGRICOLA 6 - KOSOVO by Corporal Steele

"We Don't Do Graphics". It's a statement that people have started to take on board but only very gradually. The number of disappointed customers grows fewer every day. Although the Operation started in March 1999, the current Geo Section only arrived in Theatre in July, the start of their six-month tour.

Word gets around and suddenly everyone knows what we're capable of. Customers who once might have popped in for business cards, are now looking for intervisibility plots. Squadrons who once might have requested a handful of maps are now asking for route analysis or intelligent GIS CDs. We tread a fine line between supply and demand. Out here a fresh 'geo' product is snapped up faster than a Playstation2. In order to produce the above, the Section is equipped with TACIPRINT (the mobile printing facility), TACISYS (the truck-mounted digital production system), and a MAPSP (map supply point).

Although much of our time is spent in the office, we have been out on occasions with the cameras, taking photos for terrain analysis products, making 360o views of operation locations, and also selling "Miss Agricola" posters at charity events. In addition, since the outgoing Geo Section constructed the camp's volleyball court, the Section has a bit of a reputation to maintain. An inter-department league was quickly set up, and the Section quick to join. We started by losing the first game and have been spectacularly consistent. We're thinking of changing our team name to "....*and finally*."

So, the work goes on and so do we. The Geo Section produces image maps, 'geo' products in various forms, and is currently working on connectivity of the GIS and its data production. Every now and then one of the computers will refuse to co-operate, but they always seem to back down as soon as the sledgehammer comes into view. It's just a matter of letting them know who's boss and not showing any fear.

OPERATION SILKMAN - SIERRA LEONE by Sgt. Hutton

The Geo support to the Joint Task Force Headquarters (JTFHQ) in Freetown, Sierra Leone conjures up all sorts of exotic pictures. However, the reality is quite different. The country is very much on its knees and has been for some time and the Geo Cell consists of one sergeant and a PROGRESS computer with supporting equipment. From May to October the average temperature is around 28°C but includes about 12 hours of very, very heavy rain almost each day. Then comes the humidity, followed ironically by the water supply running out then, to top it off, the power regularly goes down.

Against this background, the main purpose of the JTFHQ is to advise the Government of Sierra Leone (GOSL) on military matters, and to support the Short Term Training Team (STTT) and other British Forces personnel.

As a result, much of the Geo support is provided in the form of graphic maps portraying current areas of influence, unit dispositions, the current state of the peace process (Disarmament Demobilisation and Re-integration and the Military Re-integration Programme), and the compliance to the Disarmament Programme. Mapping of the country, which has been provided by the MOD Map and Air Chart Depot and Map Library, although mostly quite old is generally accurate and very much in demand and has been distributed to the Sierra Leone Army (SLA). More technical tasking has involved distance comparisons in support of helicopter operations, viewsheds from observation posts, and database population linking Microsoft Access to ArcView.

GTFHQ Tent - Sierra Leone

Readers who are not regulars of Radio 2 and the like may be amazed to learn that one of the most played pieces of music over the last few months has been a very pleasant ballad recalling the exploits of two renowned surveyors. Whilst not a chart topper, the story of Charles Mason and Jeremiah Dixon - surveyors of their famous line - is certainly a change from the usual pop subjects, who knows...Geri Halliwell's next hit might wax lyrical about the joys of photogrammetry or the power of GIS!

"... a proper person ... to be ... Hydrographer to this board ..."

By Captain Michael Barritt Royal Navy

When Great Britain followed the example of France and Denmark and established a Hydrographic Department in 1795, the man chosen as its head was a civilian, Alexander Dalrymple. In the words of the Admiralty Order in Council of 12 August 1795, he was "... a proper person ... to be appointed Hydrographer to this Board, and to be intrusted with the custody and care of ... plans and charts ... belonging to the public, ... with ... selecting and compiling all such information as may appear to be requisite for improving the navigation, and for the guidance and direction of the Commanders of Your Majesty's ships ...". He brought appropriate skills from his work as Hydrographer of the East India Company. RN advice was provided by a Chart Committee of three senior Captains. One of their number, Captain Thomas Hurd, eventually succeeded Alexander Dalrymple as Hydrographer of the Navy in 1808.

In January 2001 Dr Wyn Williams, who featured in "Geo People" in the Spring 2001 Edition, was appointed as United Kingdom National Hydrographer and Chief Executive of the UK Hydrographic Office (UKHO). He is tasked with discharging similar responsibilities to those of Alexander Dalrymple. However, today he operates within the international obligations placed on HMG by the International Convention for the Safety of Life at Sea (SOLAS) Convention, and faces complex demands as CEO of a Government Trading Fund. He has brought a wide range of appropriate skills from his experience of senior posts in DERA, MOD and Fleet HQ. To provide him with senior uniformed advice on hydrographic surveying matters, the Captain of the Hydrographic Surveying Squadron has assumed the appointment of Hydrographer of the Navy, including service as a Non-Executive Director of UKHO. This article seeks to explain how the roles of National Hydrographer and Hydrographer of the Navy fit together, and is written after six months' experience.

On 1 July 2002 a revised text of Chapter V of the SOLAS Convention will enter into force. Regulation 9 will lay significant obligations on contracting governments for the provision of hydrographic services comprising the collection, management and promulgation of safety critical information. Rigorous and timely appraisal of data is fundamental to this process, and is also at the heart of the reputation of the British Admiralty Chart. The process begins in the survey vessel through the oversight of a RN Charge Surveyor, who, in a warship of the Hydrographic Surveying Squadron, will also be the CO. RN staff officers from UKHO, with the same background of field experience, oversee all contract surveys that are undertaken for HMG. In office these staff officers work alongside civilian Mapping and Charting Officers (MCO), who are responsible for chart compilation, to scrutinise every detail of incoming survey data. These expert compilers then determine the significant data that will be represented on the chart, a task which applies not just to the survey data brought to the UKHO by the Royal Navy's Surveying Squadrons and its contractors, but also to the voluminous amounts of data which are received daily at UKHO from all over the world - from foreign Hydrographic Offices, from ports and harbours both in the UK and worldwide, from oceanographers, from shipping companies, from coastguards and from mariners of every type. It is the compilation of the Admiralty world chart series from all of these sources, and the skill and judgement which is applied to producing the final authoritative product, which is the mark of the UKHO's contribution to safety at sea worldwide.

In respect of surveys carried out by the RN or on behalf of HMG, the pinnacle of the system is "the Work", a meeting in which UKHO staff submit fully appraised surveys to the National Hydrographer for his approval of use for charting and promulgation by other appropriate means. The Hydrographer of the Navy is the senior specialist adviser to the National Hydrographer during this final scrutiny. As well as contributing an experienced "seaman's eye", he is able to identify issues of over-arching policy relating to field procedures, equipment and training.

In an age of intense financial and commercial pressures, the Hydrographer of the Navy also provides on the UKHO Board a clear focus on public service and SOLAS issues. He can also be an independent champion for key core skill areas in the establishment. Whilst he will bring a keen awareness of government interest in UKHO outputs, and particularly those related to Defence, he does not represent the MOD customer - this task rests with the Naval Staff Directorate of Naval Surveying, Oceanography and Meteorology (DNSOM). As a Non-Executive Director, the Hydrographer of the Navy has access to all Board business, to which he will endeavour to contribute advice as a mariner and a surveyor. Freedom of access to all UKHO staff also enables him to communicate a personal interest in each individual contribution to the timely production of authoritative and clear data.

UK was a founding nation of the International Hydrographic Organisation (IHO) and continues to provide major support to its activities. The Hydrographer of the Navy contributes to this, particularly in the area of hydrographic surveying, as requested by the National Hydrographer. Input will usually be in partnership with senior chart compilation staff and most often within the sphere of the IHO's Regional Commissions. This will frequently take the form of encouragement in technical capacity building, an

important element of defence diplomacy in such areas as Commonwealth countries without hydrographic capability. Maintenance of the British Admiralty world-wide coverage also depends on bilateral arrangements with other charting nations. The Hydrographer of the Navy can provide useful assistance to the National Hydrographer in regions where the latter's counterpart is still invariably a naval officer.

In summary, the relationship between the National Hydrographer, with his focus on the effective operation of the UKHO, and the Hydrographer of the Navy, with his day to day involvement with survey operations, is proving a fruitful combination of the "Dry" side of charting with the "Wet" side. Ultimately it enables the National Hydrographer to accept liability for the quality product for which UKHO is renowned, and to append his name with confidence at the bottom of the chart.

WHAT IS FIG AND WHAT DOES IT DO?

There are a number of professional bodies that are related to our world of geomatics and most are very well known and understood. However, one such organisation, whose acronym is familiar but whose role to many is not so clear, is FIG.

FIG, the International Federation of Surveyors, was founded in 1878 and now has membership of more than 76 national survey associations/institutions from 67 countries. The Royal Institute of Chartered Surveyors (RICS) was one of the founder members of FIG; the UK Institution of Civil Engineering Surveyors (ICES) was elected into membership of FIG in 1999.

The stated objectives of FIG are:

- To provide an international forum for the exchange of information about surveying and for the development of fellowship between surveyors.
- To collaborate with the United Nations and other international and regional agencies in the formulation of policies affecting the use, development and management of land and marine resources.
- To promote the disciplines of surveying, particularly in developing countries in economic transition.
- To promote the role of the surveyor in the management of natural and man-made environments.
- To promote the development of national associations of surveyors and to promote professional standards and codes of ethics and the exchange of surveying personnel.
- To promote high standards of education and training for surveyors and to facilitate continuing professional development (CPD).
- To encourage the development and proper use of appropriate technology.
- To encourage research in all disciplines of surveying and to disseminate the results.

FIG plays an important role in providing educational support designed to improve professional standards in less well-developed countries. It also collaborates with the United Nations, international funding agencies, international standardisation bodies and the World Trade Organisation to influence international developments. In this context, surveying is recognised by the UN agencies as being critically important to economic development, social stability and environmental management throughout the world. FIG is recognised by these international agencies as the principal spokesman for the surveying profession, representing as it does some 250,000 surveyors around the world. In addition, FIG provides opportunities for networking at a global level and for building worldwide business partnerships.

CONGRATULATIONS

The Association congratulates Captain Mick Jenkins on receiving the Royal Geographical Society's prestigious 'Geographical Award' for "..leadership in mountaineering and survey expeditions for young soldiers". Readers will recall the articles that appeared in the Spring and Autumn editions of Ranger describing the Apogee Expeditions to India, South America and Central Asia. The idea for the expeditions and the sheer hard work to turn the concept into reality, overcoming resource and political barriers en route, all stem from Mick and his leadership of a few equally hardworking NCOs. Congratulations and well done.

SURVEYING IN ADEN 1963-1964

By Patrick Fagan

Everyone of a certain age is said to know where they were when they heard that President Kennedy had been shot. For me it was a desert airstrip just north of Aden, it was around 5am, and I was to fly in a Pioneer aircraft to the island of Perim which guards the southern end of the Red Sea.

It was late 1963, and I had been posted straight from the Army Survey Course to command a Troop in 19 Topographic Squadron, then stationed there under Denis Rushworth. Chris Thompson was 2IC, and Philip Robinson the second troop commander.

My short tour there was to prove very interesting. Soon after I arrived we were rebadged as 13 Field Survey Squadron, losing some to return to the UK, but gaining a Print Troop and a new OC in David Wilson. By then a leading British political official had been assassinated and gradually our lives became more circumscribed as the up country tribal troubles moved into Aden itself. Later I was detached to spend three months on surveys in Oman (a story for another day), returning afterwards to help move the Squadron 20 miles from Little Aden to a better defended position just north of Aden itself. Quite a busy and diverse ten months.

Our first task was a second order tellurometer traverse, starting in the far west of what was then called the Western Aden Protectorate - hence my visit to Perim. This was the first stage of a linking traverse across the whole of the southern coast of Arabia, joining the geodetic surveys of East Africa with those of the Survey

Tellurometer, Aden Protectorate - LCpl Logan and Cpl Vickers

Signals support, and would disappear into the wonderfully dramatic mountain desert of the interior for three weeks each month. Our attached soldiers loved getting out of Aden, enjoyed joining in doing 'something useful', and no doubt the more relaxed out-of-barracks lifestyle on such operational work. So popular were these tasks, that during the week back in base between tasks I was often lobbied in the street or camp, asking to be taken again on attachment to us- great for a surveyor's morale!

Moving camp near Yemen Border

of India, both originating from Potsdam I believe, so it was like putting the brace into the letter "A".

It was enormous fun. A troop of 20 would have, typically, an infantry platoon as escort and RAMC and

One of our tasks was to annotate aerial photographs with detail to aid the cartographer, to locate wells and other small details, and to gather names. We took locals from Aden with us as guides where necessary, and to interpret. This work meant that we had literally to go everywhere, switchbacking over high sand dunes and wading through mountain torrents in our land rovers. Our drivers became brilliant at cross country work, and at recovering the vehicles of less competent drivers of other units, adding to the legendary exploits of the survey boys that gained currency around Aden.

A typical 3-week operation would take us into a remote area for our base camp. By day we mounted annotation and name gathering parties, before at dusk moving to our traversing stations. Three parties had to be sent out to cover the two measured legs, forward and back from the centre station where the subtended angle was observed

onto lights at the outlying stations. We were using the MRA2 by then, so that lines could be measured each way. I suppose an average leg length was 15-20 miles, depending of course on the terrain. We observed after dusk, around 6pm, in order to exploit more stable met conditions, and were usually finished and back at base before midnight, when our brilliant cooks would welcome us with the best that compo rations could run to, with a little local purchase.

The layout of the traverse was in the form of two lines with bracing struts, rather like a ladder. A survey staff officer at the Aden HQ (who shall be nameless!) used to justify his aerial swanning out of the office with the Army Air Corps, by submitting his 'plan' for future trig points to us. We did not always concur with his plans, especially after it turned out that one of his selected trig points was subject to unstable volcanic movement!

It was of course very hot, and usually humid. But on one occasion, high on a jebel feature on the North Yemen border, we were grateful for our greatcoats after dark. Our MRA2 booking sheets required a weather description as well as met details to support the subsequent Feltham-based calculations, and this was recorded as 'cold and windy'. Later Feltham queried this description in the light of the recorded temperature of 85° F - but it was all true. We had really felt quite cold, even in that temperature.

Before leaving each point, we dug a small hole, filled it with cement, and scratched the usual '+' as a mark for any future reference. Sometimes we did have to return, but always found these marks removed - even on the tops of the remotest peaks. It dawned on us that a 'C' with a centre spot might be more acceptable with locals where the crescent is so much more acceptable than a cross, and we never again found our marks destroyed.

Although our one week a month back in Aden was largely devoted to winding up one field trip and preparing for the next, there was still time for an active social life and - for me - a lot of good cricket. Our Squadron did very well in both Minor and Major (joining with another Sapper, non-survey, squadron for this) leagues, winning one and being runners-up in the other.

Although times in Aden were to deteriorate later, leading eventually to our withdrawal in only a few years, I have the happiest memories of my time there. Not just rose-tinted nostalgia, as I remember thinking then how fortunate I had been to have such splendid soldiers with me, and being engaged on such significant work in a very rugged and attractive landscape.

Radioing position to Aden

Patrick Fagan was commissioned into the Royal Engineers in 1955, and started his survey career in 1961. He was surveyor on expeditions to the Karakoram and to South Georgia, and from Aden he led the party that did the border survey between Oman and what was then the Trucial States. After tours in BAOR and Barton Stacey, he obtained MSc in photogrammetry at UCL before spending three very happy years with the OS in charge of air surveys. Successive tours at Feltham led to tours with NATO in the Netherlands and then Belgium before returning to Feltham for the last time in 1985. He retired as Director General Military Survey in 1990.

GEOGRAPHIC SUPPORT IN THE NEW ZEALAND DEFENCE FORCE

By Steve Pyatt: Assistant Director, Geographic Information

History and Background

The New Zealand Defence Force (NZDF) handles geospatial support very differently from other defence forces. This is partly due to the fact that it is a small force, totalling around 10,000 people, but also due to a unique evolution. Until 1996 New Zealand's equivalent to Ordnance Survey, the Department of Survey and Land Information (DOSLI) handled the Mapping, Charting and Geodesy (MC&G) (less Hydrographic) interests of the NZDF. Its head, the Surveyor General and Chief Executive was also designated 'Director of Military Survey' and wore the uniform of Honorary Colonel.

In 1996 the New Zealand Government split the national mapping funding and service provider functions; breaking DOSLI into 'LINZ' (Land Information NZ), the policy and regulatory authority, and 'Terralink' an enterprise with all the production assets. This left the NZDF in a quandary. It could not rely on LINZ for support as it had no assets and it did not want to entirely entrust a commercial business with its operational mapping interests. Thus it created an internal position, Staff Officer MC&G (later re-titled Assistant Director, Geographic Information) to undertake "The coordination of accurate and timely Geographic support to the NZDF by coordinating the Geographic policies and commercial arrangements with the service providers for the NZDF".

Cpl Willbond NZBATT

The appointment falls within the Intelligence and Strategic Plans Branch of HQ NZDF and the main responsibilities include staffing topographic and hydrographic issues for the headquarters, setting geospatial policy and co-ordinating commercial geo support to the NZDF.

The initial focus was on resolving what LINZ should or should not do for defence mapping and ensuring that Terralink and other service providers were capable of meeting requirements.

The next significant development was the realisation, in 1997, that GIS could provide a very flexible mapping and analysis tool. The problem at the time was that too much visibility was given to the 'glitzy' desk-top GIS software packages, with little consideration to the mammoth task of providing those systems with the requisite data to cover operational contingencies. As one former UK Director of Military Survey often stated *"Geographic support to defence forces is proportional to the geographic area of interest, not the size of the defence force"*. This is particularly true for the NZDF as it operates in such arenas as international peacekeeping rather than focusing on NZ itself. Thus high resolution NZ data is of secondary importance to medium resolution global planning data. Also, interoperability with likely coalition partners becomes vital.

To address these issues the NZDF determined to play its part as a member of several international military mapping bodies. It is in the Five Nations MC&G (now Geospatial) Directors' Conference, the Digital Geographic Information Working Group (DGIWG) and is an observer of the America, Britain, Canada, Australia (ABCA) fora. More recently it has taken the opportunity to join the Vector Co-production Working Group (VaCWG) and become a VMap level one (a digital product) co-producer. This will provide the NZDF with global medium resolution vector data which is a great starting point for rapid response, operational planning and for use in command and control systems.

Current Capability

A main Geographic service is the provision of a wealth of data and information to every NZDF employee with access to a computer by providing mapping over the Intranet using ESRI Internet Map Server (IMS). This service includes the entire NZ 1:50K topographic map coverage in querryable vector form, world maps with 'hyperlinks' to the world fact-book, and operational theatre situation maps. This service is increasing the expectations of GIS data users and IMS activity is raising wider awareness in geographic issues.

An example of the new internal Geographic support capability is the support being provided to NZ forces in East Timor. Not only do they receive the IMS sessions, but there is a GIS team providing direct support in the field who have even produced a paper map series over the local area of operations. The flexibility of this asset was most graphically demonstrated last year when a rapid response product was created in a few hours to enable the rescue of the surviving UNHCR workers at Atambui, over the border in West Timor, to international acclaim.

Current Modus Operandi

Unlike other nations, the NZDF out-sources most of its geographic production other than Hydrographic work. There is no internal 'base-plant' production agency, however the Hydrographic Business Unit is moving into this area of support now that the differences between topographical, aeronautical and hydrographic data production and handling are rapidly disappearing.

Timor team

The aeronautical charts, training area maps and exercise data sets are currently produced by Terralink, which also runs the 'World Reference Library', the NZDF's modest equivalent of DGIA's Tolworth facility. Another company, NZ Aerial Mapping (NZAM) has also provided recent operational support.

To ensure interoperability with other nations, the NZDF uses military standards where practicable. The exceptions revolve around cost, national requirements and efficiency. For example raster data and Digital Elevation Models (DEM); working with other government departments may require use of the single national topographic vector data set; or the need for non-standard Joint Operations Graphic (JOG) sheetlines over NZ's irregular shape.

The Future

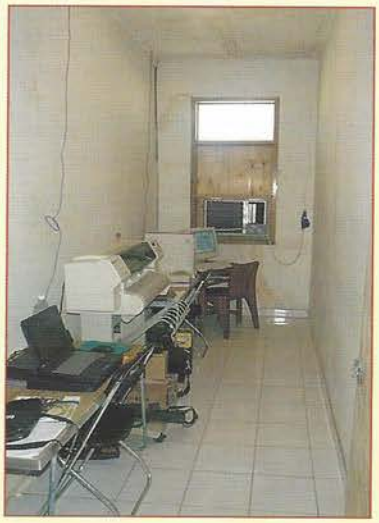
Next Generation Data:

The NZDF does not have the resources to embark on the gathering of Foundation Data (FD) and Foundation Feature Data (FFD) or similar systems in the true sense (high precision data from imagery extraction) but fully supports the concept of having medium density contingency data to support readiness, and will use VMap in lieu of FFD. Digital Terrain Elevation Data (DTED) will be used but so too will other DEMs where available and commercial imagery will be used in lieu of the elevation and military controlled image base (CIB - usually US ortho-rectified imagery) components of FD. These will then be enhanced by all means available once the area of operations is known. The draw back of this approach is that both positional accuracy and the density of features will have to be improved for mission specific data sets, rather than just the density as with true FFD, but it is more realistic for a defence force of limited resources. This has been put into practice in East Timor where the VMap level one has been improved to suit local operations within the NZ area of responsibility.

Geographic Support as a Function:

The future of Geographic Support in the NZDF is sound now that its has wide acceptance. The next growth area is destined to be in the land and facilities management area where consideration is being given to using GIS to provide an asset management tool at each main camp, base and training area. This may be another IMS facility to provide those managers with the on-line decision making information required.

The NZDF has just merged the three 'environmental' HQs (Land, Air and Navy) into a single Joint HQ, HQ Joint Force NZ. This has been set up with a Geographic Support Branch that will not only support the HQ staff but also coordinate the Geographic Support work of the force units.



Timor office

This recent example of the growth in NZDF Geographic Support bodes well for the future and the exceptional increase in user awareness resulting from the on-line mapping, both in NZ and for those on operations in East Timor, supports further expansion of the function. This is inevitable as the planned implementation of an NZDF-wide Command and Control system will require good digital mapping to provide its situational awareness and 'common operational picture' as well as being its positional reference framework.

Steve Pyatt was commissioned into the Corps of Royal Engineers in 1979 and attended the Army Survey Course in 1987/8. On promotion to Major in 1990, he commanded 1 Air Survey Liaison Section RE at RAF Wyton and then 19 Topographic Squadron RE. His final job in Military Survey was Chief of Staff 42 Survey Engineer Group during the transition from base plant activity to the mobile role. On immigrating to New Zealand he worked in a commercial engineering company for a year until joining the civil staff of the New Zealand Defence Force.

NEW SURVEY SHIPS AND SYSTEMS FOR THE ROYAL NAVY

By Richard Iabone, Vosper Thornycroft Ltd

Jan Haug Kristensen and Freddy Pøhner

Kongsberg Simrad AS

THE NEW SURVEY SHIPS

In June 2000 it was announced that the UK Ministry of Defence had placed an order for two new oceanographic and hydrographic survey ships with Vosper Thornycroft (UK) Ltd. The ships will be named HMS *Echo* and HMS *Enterprise* and are scheduled to become operational in 2002 and 2003. Survey motor boats will be carried on board, to be used for shallow water and inshore survey work. In addition to speeding up the survey of the UK continental shelf, the ships are designed to respond rapidly to short-notice survey requirements anywhere in the world in support of the Royal Navy's Maritime Contributions to Joint Operations.

Some of the main parameters for the survey ships, are:

Length Overall	:	91m
Beam	:	16.8m
Draft	:	6.0m
Displacement	:	3500 tons
Propulsion	:	Diesel Electric with ABB Azipods
Speed	:	15 knots
Range	:	9000Nm
Ice Class	:	Lloyds 1C

The ships are being purchased under the MOD's 'Smart Acquisition' arrangements. This initiative brings better value to the tax-payer by reducing lead-times and therefore costs. It is a partnering approach between Industry and Government.

POSITIONING SENSORS

The main positioning system will be differential GPS, with corrections supplied by a satellite radio link. A P-code military GPS is a secondary source of positioning information. Atlas Polartrack may be used for positioning of the survey motorboat for near-shore operations. Simrad HIPAP is used for acoustic tracking of the sidescan sonar towfish.

THE SURVEY INSTRUMENTATION

The main task of the new ships is to perform surveys, which can be either oceanographic or hydrographic and require different instrumentation, some hull mounted and some towed.

The following sensor systems are available for oceanography:

OCEANOGRAPHIC SENSORS

Instrument category	Producer	Comments
Acoustic Doppler Current Profiler	RDI	Hull Mounted
Undulating Oceanographic Profiler	Chelsea Instruments	Towed, undulating in depth0-500m. Sensors carried: • Conductivity • Temperature • Depth • Sound Velocity
Sound Velocity Profiler	Applied Micro Systems/SV+	Deployed by Hydrographic winch: Sound Velocity
XBT	Ultra Electronics/IBIS	Expendable probes forTemperature +Sound Velocity
CTD	Neil Brown	Deployed by Hydrographic winch to max 6000 m. Sensors carried: • Depth • Sound Velocity • Temperature • Salinity

The hydrographic sensors are:

Instrument Category	Producer/Instrument	Comments
Single beam Echo Sounder	Simrad EA 500 200/38kHz	For Shallow/Medium depths
Single beam Echo Sounder	Simrad EA 500 12/38/200 kHz	For all Water Depths
Multibeam Echo Sounder	Simrad EM 1002S	For Shallow/Medium Depths
Sidescan Sonar	GeoAcoustics	Towed sensor with acoustic transponder on it.100/500kHz frequency
Sub Bottom Profiler	Geo Acoustics	Integrated in SSS Towfish
Magnetometer	Geometrics G-880	Separate Towfish
Tide gauge	Valeport	With real time radio link

The hydrographic sensor suite is designed to produce high quality data for topological seabed mapping as well as detection and position fixing of objects on the bottom. To give the ships the widest possible opportunity to survey in marginal conditions, the ships are larger than the current RN Survey Vessels with 6m draft. Additionally, to eliminate acoustic signal propagation problems which may be caused by aerated water flowing along the underside of the hull, the hull mounted transducers are mounted in a streamlined construction protruding well below the hull itself: a Gondola.

The multibeam echo sounder will naturally be the main sensor for efficient seabed mapping, allowing for survey line spacing of 500-1000m in most operational scenarios. The single beam echo sounders are used as backup and as quality control tools for the multibeam system by comparing single beam data with the nadir return of the EM 1002S multibeam. The ships are not fitted for multibeam seabed mapping in very deep waters as ocean mapping is undertaken by HMS *Scott*.

The sidescan sonar is an in-service design and is a standard system of the same type that has been selected earlier by the Royal Navy as the standard tool for seabed searches.

SURVEY PLANNING AND CONTROL

While the ship is in transit, it is navigated and controlled by the Bridge Navigation System - which is IMO approved. During survey operations the ship is controlled from the Survey Planning Station. This is Kongsberg Simrad's SPS 2000 system. This is a Commercial-off-the-Shelf System (COTS) which is not IMO approved due to several special functions which are used for surveying. SPS 2000 has functionality for planning of the survey lines on an ECDIS background map. It interfaces to the positioning sensors, and takes care of the ship navigation as well as track steering of the ship along the survey lines - via the autopilot. SPS 2000 will steer the ship from one survey line through a controlled turn onto the next selected survey line, with run-in and run-out distances depending upon the length of wire streamed to towed instruments.

SPS 2000 will communicate with the Data Acquisition System when entering or leaving a survey line, so that data storage can be correctly organized.

Data describing the planned survey lines are transferred to the Bridge Navigation System so that the survey plan can be displayed on the ECDIS consoles on the Navigation Bridge during the survey. This is a unique function developed between Kongsberg Simrad A/S and Kelvin Hughes.

Chelsea Instruments new improved SeaSoar Mark II open ocean towed undulating data acquisition vehicle

ON-BOARD DATA NETWORK

Significant amounts of data will flow between different instruments and computers on board. To ease communication and to reduce the amount of cabling the ships are fitted with a Local Area Network, using 10/100Mb/sec Ethernet and TCP/IP protocols. The data network will also be used to synchronize all the computer clocks. This is an important criteria with respect to correlating different data sets correctly.

DATA ACQUISITION

The ships will have Kongsberg Simrad MDM 400 systems for centralized acquisition and storage of all

scientific data on board. Data from the oceanographic sensors will be stored in a relational database directly, while the storage of high volume hydrographic data will be organized as instrument files per survey line. The database will control the storage of each instrument file. A RAID-5 disk system is used for the centralized storage.

For redundancy reasons and to achieve a very robust system design, the most critical instruments such as the multibeam echo sounder and the sidescan sonar will store their data locally on the instrument computer's disk. MDM 400 can control the instrument's data recording remotely so that the data files are correctly organized according to the survey lines. After each survey line is completed the MDM 400 will transfer the data files to a central storage.

An artist's impression of the new Survey Vessel Hydrographic/Oceanographic

Once set-up, this approach will allow surveys to be executed with the minimum of human interaction. The Survey Planning Station will run the ship through a planned survey and the MDM 400 will control the instruments and store the collected data. The surveyor can focus mainly on quality control of the data which is being acquired.

DATA MANAGEMENT AND ON-BOARD PROCESSING

The ships will be equipped with tools which allow almost complete on board analysis of the collected data.

For oceanographic data, a special computer system, the Survey Decision Aid, will input and analyze the data in real time. Based on a statistical analysis of the data and its variability, the system will calculate what the optimum sailing plan will be to gather subsequent and supporting data. The recommended sailing plan can be transferred to the Survey Planning Station via the LAN. This will allow the sailing pattern to be adjusted according to the recommendation from the Survey Decision Aid.

The MDM 400 system will be able to produce graphic plots in a geographical framework with ECDIS background of all stored oceanographic data.

For hydrographic data, the on-board processing capability is substantial. It has been designed to meet the customer's desire to process 24 hours worth of multibeam data in 8 hours by 3 trained analysts. For multibeam surveys, the online functionality of the EM 1002S operator station will provide the main toolkit to verify the quality and consistency of the data. Tidal data can be obtained either retrospectively or in real-time. Co-tidal techniques have also been incorporated to improve the accuracy of the survey results in offshore survey areas. A less accurate estimate of the tide level in real time is also generated. This is used for online checking of the consistency between results obtained on different survey lines.

MDM will copy the relevant raw data to working directories for three processing computers, which use the Kongsberg Simrad NEPTUNE software for verification and cleaning - for both single beam and multibeam echo sounders. CARIS GIS software is used to produce fairsheets in a traditional paper format.

While the data verification and cleaning processes will produce data in limited batches with full resolution, the MDM 400 will maintain a gridded terrain model with somewhat reduced resolution for the whole survey - in line with the customer's requirements this may extend up to a maximum of 120 days worth of data. .

Sidescan Sonar data will be processed by a new computer system, SAPS. SAPS is designed to detect objects on the seafloor automatically as well as to produce sidescan sonar mosaics.

Classification of the seabed sediments will be done independently by two systems: Kongsberg Simrad TRITON will classify the seafloor from the seabed image data produced by the multibeam echo sounder, while SAPS will do a sediment classification from sidescan sonar image data.

SURVEY SYSTEM FOR THE MOTORBOATS

The survey motorboats will be equipped to do extensive hydrographic surveys in near-shore areas independently from their mother ship. They will be fitted with:

- Simrad EM 3000 multibeam echo sounder
- Simrad EA 400 single beam echo sounder
- GeoAcoustics Sidescan Sonar

The motorboats will have their own tide gauge system with radio link. Horizontal positioning will be by dGPS or Atlas Polartrack. Survey planning and control will be the same as the parent ships: Simrad's SPS 2000 system connected to a track steering autopilot. Data which is collected by the motor boats will be transferred to the survey system on the mother ship by use of a replaceable hard disk, with data organized in a format that can be read and decoded by the MDM 400 system.

TRANSFER OF DATA TO THE SHORE-BASED PROCESSING CENTER

The MDM 400 on board the ship will prepare data tape cassettes for export to the shore based processing centre. One survey may generate several of these cassettes, since at full production rate one cassette is generated per day of surveying. Each cassette will hold raw sensor data as well as processed results, and also data generated by the survey motorboat.

Oceanographic data will be transferred as a database. A MDM 400 is part of the UK Hydrographic Office and Training School equipment fit. These MDM 400 systems will decode oceanographic and hydrographic data, keep track of the different data sets, and export oceanographic data in a form suitable for post processing.

TRAINING ISSUES

All these sophisticated survey systems will be operated by Royal Navy personnel. There is therefore a continuous need for education and training. This need will be met by the Training System in the RN's own Training School operating the same processing software as the ships.

CONCLUSIONS

The new survey vessels will provide the Royal Navy with a major increase in survey capability. Their operational speed and range, as well as their suite of hydrographic and oceanographic sensor systems will provide the RN with a considerable capability for the early part of the 21st Century.

The selection of Kongsberg Simrad as the main System Integrator for ship-borne as well as on-shore survey sub-systems, has made it possible to plan the whole concept by the same group of engineers. This scenario has been fruitful in the sense that the system design is a major improvement over earlier designs, concerning:

- Reduction of tedious and time-consuming routine jobs for the survey crew, by automating the sailing and data collection work
- Making extensive use of the ship's LAN for data communication and synchronisation of clocks as well as instrument operations
- Built-in redundancy and fall-back operation scenarios in case of component or sub-system breakdown
- A high degree of data visibility as soon as it has been acquired
- A high degree of safety against loss of data, combined with adequate data security
- A natural environment for data processing on board
- Integration of survey motorboat operation
- Porting of data to shore and making them available for final post processing in an orderly and well organized manner

The Integrated Survey System will be assembled and tested through the summer 2001, and installed and made operational during the following winter.

MULTI SPECTRAL TRIALS 2000 "MUST 2000"

Queensland, Australia, May/June 2000

By Major Dave Rowlands RE

Before leaving the UK for Canada on the Military Survey Exchange Officer programme, I never once imagined that I would be given the opportunity to lead a survey task on the coast of Queensland, Australia and, more importantly, only a stone throw away from the Great Barrier Reef. As a result of some very good collaboration between the Defence Research Establishment, Ottawa (DREO) and J2 GEO, a request was supported to allow a team of Canadian Geomatics technicians to deploy for three weeks in support of the MUST 2000 trials.

"Vehicle-mounted RTK roving station awaiting deployment in conjunction with sensor fly past".

The trial was a Sensor Action Group 5 (SEN AG-5) and SEN AG 4 group event under the auspices of The Technical Co-operation Program (TTCP). The objective of TTCP is to provide a performance assessment of High-Altitude and Space-Based (HA/SB) sensor systems for wide area surveillance with emphasis on understanding the performance and capabilities of current and near-term systems; and to investigate the utility of these systems for specific surveillance applications.

The MUST 2000 trials were the largest trials of their kind ever conducted. Acquiring data over land and maritime targets tested a plethora of ground, space and airborne sensors. The data will be used during the next few years to evaluate the utility of radar and hyperspectral sensors for target detection, classification and for sensor fusion on behalf of military requirements.

Over 200 scientific, technical and military personnel from four nations (Australia, Canada, United Kingdom and the United States) participated in the trial. The Canadian contribution included a Geomatics Team from the Mapping and Charting Establishment whose mission was to provide geographic support to the Canadian elements of the trial. However, from the start of the trial, it became evident that the geographic requirements were underestimated by all participating nations and as a result, the Canadian Geomatics Team found itself in high demand for the entire duration of the trial.

From a Canadian perspective, the trial proved to be a useful vehicle for evaluating the use of Real Time Kinematic (RTK) survey techniques. At the time it was the aspiration of Defence Geomatics Canada to upgrade their current geodetic receivers to facilitate RTK capabilities. The Australian rainforest and varying coastal terrain provided a challenging environment where the siting of radio transmitters was critical to achieve effective signal propagation. Satellite lock was not the main issue, as it was evident that the GPS signal was capable of penetrating light to medium canopy. The differential radio link was often the main 'show stopper' and was overcome by elevating the radio antenna using obsolete telescopic antenna masts. Excellent results were obtained and some very important lessons were learnt that would subsequently be used to develop procedures now the unit has taken delivery of its own RTK equipment.

In addition, new software procured from AutoCAD that allowed direct importation of data files for on the fly graphical representation of acquired data was also used for the first time by MCE. The software provided a bridge between real time data collected in the field and the Geographic Information System (GIS) that was to be used to analyse the subsequent imagery. GIS compatible file formats were transferred easily, allowing efficient geo-coding of imagery to take place without any further processing. The obvious advantage here is that the surveyor need not spend the obligatory evenings burning the 'midnight oil' processing that days data.

The most challenging aspect of the trial was rainforest categorisation. In order to classify and document specific types of canopy cover ranging from open rainforest to dense mangrove, very accurate ground truthing was needed. This required the painstaking positioning and identification of each flora within a given 50m-square patch of vegetation. A local botanist provided the flora input and GPS was used to position the patch. Using a system of grids (and a lot of string!)

"Vehicle snorkels were a necessity to access trial sites!"

each tree was registered in relation to the known geographical position of the patch. Of course, stumbling through the Australian Rainforest has its dangers. The plants and trees themselves were dense and often 'aggressive' (the Lawyer Vine resembled razor wire). In addition, the rainforest is home to some of the world's deadliest snakes and spiders and not forgetting the Cassowary which is a very protective Emu-like bird that can tear a man's heart out with its talons (At least that's what the tourists are told!)

Maritime targets were also positioned using the RTK system. A boat-mounted RTK was used to position craft off the coast in coincidence with the sensor's systems. Accuracy clearly varied due to tidal effects specifically in height, but for the purposes of analysis, the positional results, in relation to a specified tidal time, of +/- 0.25M were acceptable.

In addition to the accurate survey work, the hand-held Precision Lightweight GPS Receiver (PLGR) was used to identify flight paths for the airborne sensors. Pilots initially had problems identifying ground targets but by providing them with PLGR coordinates (+/- 10M), they could program their in-flight navigation systems to correspond with the path of targets on the ground.

Of course R & R was a MUST considering the idyllic location of these trials. The team managed a boat trip to the Great Barrier Reef where we dived and explored the reef at a 10m depth. Swelling seas made for a roller coaster ride and we were the only members of a 25-strong party to avoid seasickness during the 90-minute trip out to a secluded reef. Riding the bow of the ship with one eye on the horizon was my only way of remaining 'in control'. Swimming in a creek, leisurely golf and a visit to a crocodile farm were all welcomed. In addition, a harbour boat trip was well received during the stay over in Sydney. One member was refused to board the plane home because she was carrying two very offensive weapons. Personally I cannot see how anyone could throw a boomerang in the cabin of an aircraft! Memorable moments include smothering ourselves in baby oil (a recognised deterrent) to avoid being savaged by the Australian rainforest red mite. The trial was subsequently followed by a second trial in Hawaii but I will save those stories for later!

"Extending antenna through the canopy to ensure sensor vehicle lock"

Dave Rowlands joined the Corps of Royal Engineers as a junior soldier in 1985, having qualified as an Electrical and Mechanical Draughtsman. He was subsequently commissioned into the Corps in 1989. His first Tour as a junior officer was with 19 Topographic Squadron at Hermitage, where he got his first taste of Military Survey. Subsequent postings to Germany, Northern Ireland and various Engineer Regiments in England gave him the opportunity to serve in Iraq/Kuwait, Norway, Kenya, Bosnia-Herzegovina and Belize. After attaining an MSc in Defence Geographical Systems at the Royal School of Military Survey in 1999, he was posted to Mapping and Charting Establishment, Ottawa, Canada where he is currently serving as the Survey Exchange Officer.

CAN YOU HELP!!

Information on the Second World War Satellite Landing Grounds required.

A group of enthusiastic aviation historians are carrying out research into the long forgotten satellite landing grounds used during the Second World War. These were created to hold aircraft in storage and were mainly located in the grounds of stately homes such as, Beechwood Park near Luton and Woburn Park, each of which held up to 200 heavy bombers in store and later for scrapping in 1945.

The entire project was in the hands of consultant civil engineers Rendell, Palmer and Tritton who seemed to have disappeared without trace! They must have employed surveyors in order to select and layout the sites and again the historians have been unable to find a single person who had been involved in the project despite enquiries at all relevant professional institutes.

Anyone with information about either the landing grounds themselves or the Company involved is asked to contact Barry H. Abraham on 0161 4834851, mentioning Ranger when you call him.

GEO PEOPLE

Mrs Margaret (Maggie) Jacobs

Director Defence Geographic Centre

Mrs Maggie Jacobs was appointed as Director, Defence Geographic Centre (DGC), Defence Geographic and Imagery Intelligence Agency (DGIA) on the 1st of April 2000 on the formation of the DGIA. As Director DGC she is also a member of the DGIA Board. The DGC is based at Feltham in Middlesex and is responsible for the provision of geospatial information for Defence Operations, Planning and Training.

Her previous appointment was as Head of the UK Defence Imagery and Geospatial Liaison Staff in the Americas. This post is based at the US National Imagery and Mapping Agency and reports direct to Director Geospatial and Intelligence Collection in the Defence Intelligence Service.

Before her US tour, Mrs Jacobs spent the previous 26 years of her MOD career as a geographic specialist with Military Survey. On promotion to Grade 7 in 1985 she moved to International Requirements and travelled extensively to the US and to NATO meetings around Europe. She became the first Deputy Director of Plans and Personnel on promotion to Grade 6 in 1990 and joined the Board of Directors of Military Survey in 1995 as Director of Geographic Information, where she was responsible for the worldwide acquisition of geographic information, the MOD Map Library (Tolworth), and the MOD Map and Air Chart Depot (which moved from Guildford to Feltham in summer 2000).

She graduated from the London School of Economics with a BSc (Hons) degree in Geography and Anthropology in 1968, followed by a Graduate Certificate in Education. She taught geography and geology to Advanced level for 2 years, before joining Military Survey.

Her outside interests include travel, gardening and collecting antiques. She is married to Duncan, who retired from Military Survey in 1999 after 16 years as a civilian, having previously served 23 years in uniform. They met while working for Military Survey in Hong Kong in 1979.

Captain M K Barritt Royal Navy

Captain Hydrographic Surveying Squadron and Hydrographer of the Navy

Captain Michael Barritt has been in command of the Hydrographic Surveying Squadron since December 1999. His incumbency has seen a growing demand for short-notice support to operations and exercises alongside long-term data-gathering programmes - as described in a separate article. He was appointed Hydrographer of the Navy in January 2001 to provide senior surveying and sea-going advice to the National Hydrographer and Chief Executive of the United Kingdom Hydrographic Office (UKHO). This activity is also covered in a separate article.

Captain Barritt joined the Royal Navy from Pembroke College, Oxford, and subsequently qualified as a hydrographic specialist seeing service in the Pacific and Indian Oceans, UK waters, North and South Atlantic Oceans, Caribbean Sea, and the Southern Ocean around the Falkland Islands and Antarctica. He commanded HM Ships *Echo*, *Bulldog* and *Hecate* in a full range of hydrographic, oceanographic and geophysical survey tasks. HMS *Bulldog* was also in the van in participating in exercises to develop combat survey support for Amphibious Warfare and Mine Counter-Measures operations.

He has held three appointments in the MOD. As Territorial Waters Officer, in 1985-86, he provided technical advice to all government departments on delimitation issues. As Superintendent of Surveying Policy and Planning in the Hydrographic Department (Whitehall) in 1991-94, and as Assistant Director (Policy) in the Directorate of Naval Surveying, Oceanography and Meteorology in 1995-98, he contributed to a wide-ranging review of the RN Hydrographic Service. This included the prioritisation and management of the UK Defence and Civil Hydrographic Programmes, the introduction of the new HM officer specialisation, and adoption of new approaches for purchase and operation of surveying ships.

He served with NATO in 1994-95 as Military Assistant to Deputy SACLANT. In MOD he promoted close international liaison with the hydrographic services of other navies, and was the first co-president of a France/UK Joint Working Group. In December 1998 he led a joint UK/French Study Team in the Caribbean Region on behalf of the International Hydrographic Organisation.

He is a Fellow of the Nautical Institute and of the Royal Geographic Society, a Younger Brother of Trinity House, and was one of the first RN members of the Honourable Company of Master Mariners.

Captain Barritt and his wife live inside Devonport dockyard and enjoy working an eighteenth century kitchen garden. He is kept busy by involvement in several Service Christian charities and societies and as Chairman of the RN Birdwatching Society.

Robert (Bob) Taft

Managing Director, LH Systems Limited

Bob started his career as a trainee cartographer with Military Survey, Feltham in 1966 when the establishment was known as the Survey Production Centre (RE). He moved into Air Survey in 1968 and did not realise at that time that he would still be talking inner, relative and absolute orientations 35 years later.

Bob was recruited in 1974 by another former Feltham reprobate, the infamous Thomas Docherty, to manage Applied Earth Sciences, a company based in Bismarck, North Dakota. Their primary application in photogrammetry was compiling large-scale maps for proposed new open-cast mines and monitoring the monthly yield of coal from existing ones. The mines were spread over a wide area of the Dakotas, Montana, Utah and Wyoming and offered Bob many opportunities to spend months on end with only rattlesnakes, mustangs and coyotes for company (thanks Doc!). He particularly remembers the winters when the temperature would drop to less than -50 and when it's that cold, it doesn't matter if you are talking C or F. But at least it was a healthy life style, at those temperatures even the bacteria hibernate.

Crossing back over the pond in 1979 he joined up with Geosurvey International and was appointed their Marketing Manager covering Europe and the Middle East with frequent visits also into the African continent. But then in 1984 he met with another face well known to the Defence Surveyor's Association, David Wallis, then of Survey and General Instrument Company fame. Together they supplied and installed many pieces of specialised photogrammetric equipment to Military Survey in the mid and late 1980s and Bob found himself driving back in through those Feltham gates that he had once thought a piece of history.

LH Systems is a wholly owned subsidiary of Leica Geosystems that was originally conceived out of a partnership, started in 1992, between Leica and GDE Systems (now BAE Systems) to develop, sell and support various types of aerial sensors and digital photogrammetric systems. Bob was appointed Managing Director of the UK-based subsidiary in 1997 and has overall responsibility for the company's operations in UK, Netherlands, Scandinavia, Spain and Portugal.

He lives in Redhill with wife Julia (nee Dunmall), another "graduate" of the Feltham cartographic training school and matrimonial agency. Their daughter Jennifer is a Bachelor of Music and their son Dale is attending Southampton University before taking up a scholarship to Sandhurst starting in January 2004. Bob lists his hobbies as music (still playing the organ), tennis and motoring. He was heard to remark recently that after driving big family cars for many years he has now invested in a "menopausal machine", a 3 litre, 24 valve, 220 bhp coupe but has yet to take it over the magical 150 mph threshold, he's just waiting for that next trip to Germany.

SURVEY SUPPORT TO THE ARTILLERY: SICILY 1943

By Frank Spaven

These recollections were set down eight years ago to mark the 50th Anniversary of the first Allied landings in Europe, on the southern beaches of Sicily on 10th July 1943. This was part of what Churchill called "the soft underbelly of Europe", which he saw, and vigorously promoted against US doubts, as the right quarter for the next strike, after our final defeat of the Axis armies in North Africa in Tunisia on 13th of May.

Having come through that campaign with Eighth Army, my unit, 517 Field Survey Company, Royal Engineers, was now called upon to provide a Topographical Section to give survey back-up to the artillery in the forthcoming invasion. Where this was to be we were not told (though it was apparently put about by effective allied ruses that it would be in Sardinia or Greece). What we were told was that a recce party should go in with the infantry in the first landings, in case survey was required immediately and the CO decided this was to consist of Doug Thomas, Don Cresswell and myself.

So off we went to a training exercise with, praise be, the 51st Highland Division at Bougie in Algeria. There, with the 5th Battalion of the Black Watch, we practised landings on a beautiful, but now explosives-hit beach, from LCI (Landing Craft Infantry) shallow draught ships with exit gangways mounted on both sides of the bows which were lowered into the water on beaching.

This training certainly made us feel part of the real, and especially the Highland, army. I well remember a group of off-duty Jocks strolling down a cobbled street, one of whom, when he saw me approaching, called out "Eighth Army - up!" and they all saluted me smartly (perhaps recognising my knees as being as brown as their own, unlike some of the First Army!). Then there was a march through the village to the beaches behind the pipes playing - the stirring first and only time this happened to me in the war. Above all, there was an interview with General Wimerley, the CO of Highland Div, arranged by his Intelligence Officer to explain what I was planning to do, at the end of which he said "You are a Scot, aren't you" "Yes, sir" I replied. "Then why aren't you part of my division?" I told him I regretted my unit was too specialised and therefore usually only part of Army or Corps troops.

A few weeks later we were all set to go, camped outside the port of Sousse in Tunisia but now attached to the 1st Battalion of the Gordon Highlanders. At a briefing session, I remember being told the landing could be as costly as Dieppe and wondering, in my bivvy tent in the olive grove, whether we would see home again. We were also told where we were going, though with code names on the maps, the extreme South East corner of Sicily, and Europe, at Cape Passero. I had been given photographs and a sketch, taken from an offshore submarine, of our particular stretch of low, undulating coastline which had a lighthouse at one end.

We set sail from Sousse in a splendid armada of LCIs, with a piper playing in the bows of the one next to us, and landed in Malta. There we bivouacked for two days and were visited by General Montgomery who told us not to think of the "Eyeties" on their home ground as a soft option but to "kill them".

Then, for the onslaught itself, we set off with the HQ Company of the Gordons in the dark from Valetta for the 65-mile crossing to Sicily. The weather and sea were appalling as a storm had sprung up that was so bad that many gliders and paratroopers were lost at sea or landed in the wrong place. Our LCI heaved and tossed while below our wire bunks, half a foot of seawater, fuel oil and seasickness surged back and forth.

But we made it, a bit later than intended but still before dawn. We looked out in front and saw a coastline vaguely similar to the sketch I had but overcast with cloud, so we wouldn't be doing astro or sun shots. As we got nearer, we were met by bursts of heavy machine gun fire ricocheting off the decks but we proceeded steadily inwards, right into a rather steep looking beach under a low hill. The gangway ramps were lowered and we clambered down and off into water up to our necks and for Doug, a short man carrying a heavy theodolite, over his head. We waded out, scrambled up the steep pebbly beach, met with no enemy fire at all and before long had a slit trench gratefully dug for us by Italian POWs.

After a while, as there was nothing useful for us to do on the beach, we went up the low hill behind. There, on the top, was the sandbagged machine gun post that had fired on us whilst we were offshore but not once onshore, with two dead Germans in it. Farther on a bit, we said farewell to our Gordons comrades one of whom, their MO, had been a student cross-country runner with me at Edinburgh; I last saw him going off with a vast First Aid rucksack on his back. We then went up into the lighthouse, the co-ordinates of which were known, and made some observations from it (not easy, it was swaying). When we came down, the nearby villagers were looting the keepers' bedding and supplies.

The rest of my Sicilian recollections, after our vehicles and the full section arrived, are a confused jumble of frequent movements and battles around hill villages, often not lasting long enough for our accurate surveys to be completed. On the other hand, the 4th Survey Regiment RA with whom we worked when possible, distinguished themselves by keeping up with the moving campaign and their CO Lieutenant Colonel Whetton, was awarded the DSO on that account.

We certainly kept closely enough up with the artillery of 51, 78 and Canadian Divisions to be quite often under shellfire. On one occasion not long after the landings, I was walking gingerly through the debris of an Italian column's destruction when I became aware of a figure watching me; it was an African colonial soldier, standing up against an olive tree - dead.

The fighting became intense, especially later around Gerbini airfield and Sferro to the west of Catania, and the casualties high. After six weeks, Sicily was won, at a recorded cost of 23,000 British, Canadian and American casualties, against 164,0000 Italian and German (including prisoners) and some 100,000 who retreated to the mainland.

Even for the unscathed, there was always the heat - the hottest part of Italy in the hottest month - the dust, the barren, dried-up hills to be climbed, the dire poverty of the peasants all around, the ruins of towns and villages smashed by our bombers, the smell of bodies therein and from soldiers' shallow graves in cracked, hard-baked, black clay, the lack of sleep and, for me, an attack of boils, followed by malaria which put me in hospital. Europe it might be but I preferred North Africa and vowed never to return.

But I would like to see that beach again; and the guidebooks say there is a nice fishing and holiday village around the corner at Partopalo!

FDN Spavan
10th July 1993

Frank Spaven graduated in Geography and in 1940 joined the Survey Training Centre RE and was appointed a Topo Officer in 517 Field Survey Company. He was with them until 1944 when he joined 518 Company, spending the wartime years in diverse and privileged service in many countries around the Mediterranean. From 1946 to 1977 he worked in the Scottish Office and the Highlands and Islands Development Board as a researcher and planner. He maintains a keen interest in maps with Inverness Civic Trust, the RSGS and walking and railway societies. He is married with two sons, both in transport.

"Greenwich Group" for the study of the History of Military Cartography

By Peter Chasseaud

The Greenwich Group was set up following the very successful Conference on Military Mapping in the 20th Century held at the University of Greenwich in January 2001. The initial composition of the Group was largely drawn from those giving papers at that Conference; these papers will appear in a special issue of the Cartographic Journal at the end of this year or the beginning of 2002.

The first meeting, chaired by Peter Chasseaud, was held at the British Library on 23rd May 2001. No firm conclusions were drawn about the precise definition of military cartography or the composition or scope of the group; it was agreed that what was important was liaison between people working in broadly related areas, and that invitations should be extended to others, particularly map curators and anyone with research-in-progress. Meetings will be held approximately every six months.

Among a number of subjects discussed was the great concern felt regarding the disposal and possible destruction of military survey documents and records, and there was general agreement that individuals should write expressing their anxiety about destruction of records and hence their non-availability to present and future cartographic historians. In addition to officially held records, it was agreed that thought must be given to preserving relevant materials held as mementoes by individuals. Alan Gordon asked the meeting to note that the Military Survey Branch of the Royal Engineers Association was holding a meeting in September at Ewell and would be discussing the appropriate depository for historical records, etc., held by their members.

Peter Chasseaud

THE TERRY STRAETER PRIZE

By David Steele

Between April and December in 2000, I attended a technician course at the Royal School of Military Survey in Hermitage, Berkshire. This course awards an HND to the successful student. As part of that course, every candidate was given a project to work on, and I was tasked with investigating the methods of showing terrain visualisations to see where improvements might be made in the future. Having spent quite a few years working with 3D animation, I decided to see what could be achieved with applications more suited to rendering scenes from Star Trek than the traditional Geographic Information Systems commonly used by Terrain Analysts.

I got to work producing everything from models of trees to terrain sections and cityscapes. After several months of late nights and red eyes, the last full stop was placed on the page and the slideshow was put together to be assessed as the presentation phase of the project. I expected the briefing to be well received, but I had no idea just how far I would go before I was finished. Soon enough, I was giving the presentation again, to an invited audience from the Army Survey Course. Later, an e-mail from the Chief Instructor told me I would be included in the Geo Study Day - an annual conference for all things technical in the Defence Geographic world. That alone would have been a big enough deal, but a phone call from the Squadron 2IC capped the lot.

"Cpl Steele - I just thought you'd like to know your presentation has won an award from a civilian company called BAE Systems. The award is to be presented to you by Dr Terry Straeter, but there's a bit of a catch. He's too ill to travel at the moment, so you'll have to pick the award up yourself - in San Diego."

Can you imagine how gutted I was? I landed at San Diego airport on a warm Monday evening, to be met by Kyle Telleson, the company representative. It seems that BAE Systems take the reputation of American hospitality very seriously. We sat in a restaurant overlooking the bay, watching the jets practice their manoeuvres on the aircraft carrier moored there.

"Just so that you know," he told me, "everything is on the house while you're here. Would you like a hire car? How about a drink in the Airforce Bar where they filmed Top Gun?" Later that night, I moved into my hotel room, which was about the same size as my entire married quarter.

The next day was for sightseeing. San Diego is a boomtown that's been growing since the microchip revolution. It's the sunniest and warmest city in America, and seems to serve as a retirement centre for the USA's elite. Having left England's freezing weather behind, I was able to walk around in summer clothes as the temperatures hit the eighties. The afternoon was spent cheering on Kyle's son at a "Little League" Baseball game, while I mentally prepared myself for the day ahead.

The huge auditorium was filling up rapidly and I had a bad case of stage fright. As row after row of experts filed in, I asked for a drink of water, only to discover that I was shaking so badly I could hardly pour it from the bottle. Eventually, the CEO made a short speech and it was my turn. I took a deep breath and loaded up the first slide, then all the nerves disappeared, I found my voice, and managed to give the performance of my life.

After the applause had died down, Dr Straeter presented me with my award, and then I shook hands with just about everyone in the company. Armed with my crystal decanter, I spent the rest of the day being shown around the development offices - a good way to see what we'll be doing over the next few years.

On Thursday morning, with the adventure over, there was nothing to do but say goodbye and start the never-ending journey back home. After a near eternity of travelling, my three-year-old son enthusiastically greeted me at the door.

"Daddy - you've been to America"?
"That's right."
"Where the cowboys are?"
"Yes."
He paused for a moment, deep in thought.
"So how many did you shoot?"

David Steele joined the Army in January 1990 and has just completed his Terrain Analysis Class One Course at the Royal School of Military Survey.

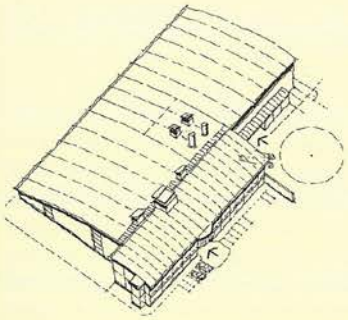
He has served with JARIC at RAF Brampton and 13 Geographic Squadron at Hermitage and has been on an operational tour of Bosnia. He is about to deploy to Kosovo as part of the Geographic Detachment of Headquarters Multi-National Brigade (Centre).

He is married to Jo and they have a son Christopher.

MOVING THE EARTH - RELOCATING THE MOD MAP LIBRARY

By Ron Shepcar, Tolworth Relocation Project Officer

The Spring 2001 Edition of The Ranger contained an article on the relocation of the MOD Map Depot. At long last, it now appears that all major elements of the Defence Geographic Centre (DGC) will soon be together on one site. The MOD Map Library is scheduled to move to Feltham, Middlesex in late 2002.



Achitects vision of MacLeod

The Map Library, which primarily services the needs of the MOD and other government departments, has been located at Tolworth, Surrey, since 1950, on a site shared with MAFF until a couple of years ago. Their relocation to London and subsequent desire to dispose of the site, has provided the impetus for the move, which had been talked about for many years.

The Map Library's worldwide collection of current topographic mapping has steadily grown to become the largest in Europe, with around 600,000 different maps held. This material is supplemented by the Reproduction Material Library's 34,000 sets of components and the Library and Information Centre's 80,000 documents, which include over 2,000 gazetteers. Digital data holdings are also rapidly expanding, although the majority of these are currently located at Feltham, in the Digital Products Library.

The collections at Tolworth are housed in what was originally built as a hospital for the D-Day landings. Fortunately, it was never used as such and was converted to office accommodation in the late 1940's. The original building consisted of a long corridor backbone sprouting fourteen spurs, but this has been supplemented by the addition of several Portacabins, to accommodate the continually expanding collections.

Plans are now in preparation for the construction of purpose built accommodation on the site of C Shed at Feltham. This new building will also house DGC's Geographic Information Group elements which are already sited at Feltham, as well as the Reprographics and Stores departments currently located within Redman Building at Feltham. In keeping with the tradition of naming buildings in honour of distinguished surveyors, the new structure is to be named MacLeod Building.

Maj Gen Malcolm Neynoe MacLeod was heavily involved in the production of trench maps and championed the use of air photography. He also successfully established the policy for military map scales in war, which is still broadly in use. Maj Gen MacLeod held strong views on the types of maps required for war and as Director-General Ordnance Survey, printed over 100 million maps during the Second World War (three times the total production for the First World War).

Outline plans for MacLeod Building have been developed following much consultation over the past few months and construction is scheduled to commence immediately following the appointment of the contractor in December 2001. The building should be ready for occupation in September 2002 and it is then that the 11 mile move from Tolworth to Feltham should begin. The move is expected to take around 3-4 months with redevelopment of the Tolworth site to follow soon afterwards. Redman Building should be vacated a few months later, following the relocation of Repro and Stores to MacLeod Building, and will then be demolished.

Feltham site with MacLeod orientation

The relocation will enable much closer contact between the Map Library and it's main users in DGC's production areas at Feltham and will help to develop a much fuller appreciation of the valuable information contained within the diverse and evolving geographic collections.

Ron Shepcar joined the Defence Geographic Centre [then MCE RE] in 1984. A brief spell in air chart production was followed by tours in Production Control, Library and Information Centre, Geographic Commitments and Geographic Research. He previously worked at DOS (where he first met his wife, Julie) and the Land Resources Development Centre. Surviving Feltham Garrison rugby matches, Survey half marathons and sprint triathlons are long in the past. He now turns out for the MRLG cricket team, is an occasional Tolworth Dynamo, and still enjoys badminton. His other interests include modern architecture, graphic design and music programming.

ADMIRALY CHARTS IN THE MAKING

By Nigel Smith, UK Hydrographic Office

The role and operation of the United Kingdom Hydrographic Office (UKHO) differs somewhat from that of other Hydrographic Offices throughout the world. Most are charged with collecting and publishing navigational data covering their own home waters, to enable both domestic and foreign shipping to enter, navigate and leave their national waters safely. But for historical reasons, the UK's Office - nowadays a Ministry of Defence Agency - has since its foundation in 1795 maintained and published a world series of navigational charts, covering all the world's oceans and seas: over two-thirds of the earth's surface.

The great age of exploration and discovery in which British seafarers featured so prominently, and the trading and naval dominance of the British subsequently, produced as a by-product an unrivalled hydrographic resource, whose reach extended world-wide. The charts produced for the Royal Navy began to become available more widely in the nineteenth century and the world series is maintained to this day in both paper, and increasingly, in digital form as part of a comprehensive electronic chart service.

Naturally, navigation over the shallow continental shelf demands more detailed charts than are needed for the deep oceans, most of which are still unsurveyed. Comprehensive detailed cover is published of all oceans, passages, and major ports and approaches. Where the UKHO is, or until recently has been, the responsible hydrographic authority (UK waters and dependent territories, certain Commonwealth countries and areas such as the Persian Gulf, the Red Sea and parts of the eastern Mediterranean) detailed charts are compiled of both major and minor ports, and certain anchorages. These "primary" areas account for about one third of the renowned *Admiralty* chart series. The other two-thirds are compiled either from the chart data of other national hydrographic offices or increasingly in joint publishing arrangements with them. These publishing arrangements, such as the recent concord with the Maritime and Port Authority of Singapore, which has imported new "dual badged" charts into the series, will further enhance the currency and accuracy of the *Admiralty* series.

The Nautical Chart

A nautical chart, whether paper or computer-based, is essentially a work sheet or computer screen on which the intended courses will be plotted, clearing lines for dangers added, bearings laid off and positions established. It cannot be described as the marine counterpart of the topographic map since it is far more than a representation of physical features, seen and unseen. For example, it gives the characteristics of both navigational aids (lights, buoys...) and landmarks, in a succinct international code of symbols and abbreviations. Moreover charts are being pressed into service in new ways. They have always helped to prevent accidental strandings, but now they play a vital part in preventing collisions, being the only effective means of representing the internationally mandatory details of ever-increasing numbers of routing systems and regulated areas on to the featureless surface of the sea. They are also important aids in the planning, conducting and expediting of a voyage, thereby minimising costs and aiding efficient maritime trade.

Limits and Scale

Every chart is individually designed (schemed) either to meet a specific local need such as the development of a new port, or as part of an interlocking sequence of sheets on a common scale, for coasts and seas with well defined physical or national limits. An important aspect of the UKHO's work is the monitoring of port development and new routes and importantly the acquisition of new hydrographic data, thereby anticipating the demand from users for new charts. In any such series there are no butt-joins but varying degrees of overlap to suit the coastal configuration and navigational requirements. Scales vary from about 1:2500 (large scale) for a small port to 1:10 000 000 (small scale) for ocean route planning, but with no hard and fast divisions between one type of chart and another.

Compilation: specifications & source data

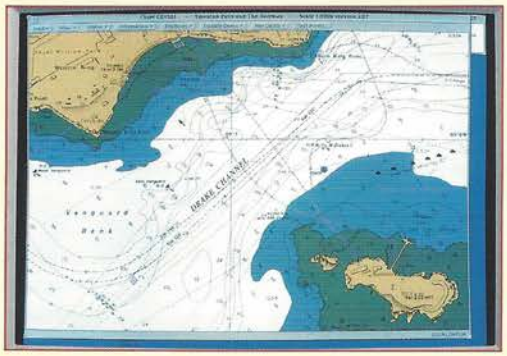
Once the scheme for a new chart has been approved, specifications are written for the professional cartographer who will have to select and assemble the detail from all available, and often very numerous, source materials. The cartographer's raw material is still characterised by diversity: differing tidal (vertical) and geodetic (horizontal) datums, languages, dates, quality and so on. It is part of the cartographer's task, using the latest computer-assisted cartography systems, to create unity out of this diversity; to produce a chart which is consistent, clear and as reliable and accurate as his source materials allow.

It must therefore be appreciated that a chart, especially one compiled from primary sources, could typically take as much as 4 months to produce. The demands of the mariner are far more exacting than they used to be; for example, greater draughts, higher speeds and the precision of satellite navigation systems all severely test the adequacy of all but the very latest surveys and the charts compiled from those surveys. The penalty for an inaccurate chart may be the grounding of a vessel and the consequential danger to life and the environment. However the chart can only represent the information available, and even today, in many parts of the world, the only surveys are those that originate from the dedicated work of the early surveyors using lead and line. At that

time the only ships whose needs were considered were sailing craft drawing 2 to 5 metres instead of a modern merchant vessel's 15 to 25 metres. New charts now declare the date, scale and origin of the surveys used in "Source Data" diagrams. It is hoped that this essential aid to the interpretation of the chart will encourage a more cautious attitude to the navigation of unfamiliar waters such as that increasingly undertaken by cruise ships and yachts.

Compilation: selection of detail

A key cartographic skill is the selection of detail appropriate not only to the overall design and scale of the chart but to each part of the chart: offshore, inshore, coastal, inland. The navigator is a busy, often harassed individual, usually with other responsibilities. So, significant facts have to be selected for him. To do this, the cartographer must understand the relative significance to the mariner of all the items of information available, against a background of a marine environment subject to ever-increasing change. The exploitation of offshore oil and gas, voluminous routing measures, and a host of changes related to the use and increasing regulation of coastal waters, all present challenges to the overriding requirement for a clear, easily used and updated chart.



A raster chart is a facsimile of the paper version.

The UKHO's working guidelines for the representation of chart information still however lay emphasis, as they have always done, on the scope for the cartographer to exercise his or her own judgement in assembling the chart detail and deciding what is to be included and - just as important - what can be omitted. A glance at the official charts of some other countries can demonstrate strikingly the contrast between the mass of detail contained on them and the spare uncluttered Admiralty charts of the same area. Some national compilers prefer to display the maximum validated information, whilst the UKHO chart places a high premium on compiler judgement and the selection of key data for representation on a chart which will be used by navigators who may struggle with information overload.

Compilation: quality assurance

Extremely thorough editing and verification procedures are necessary in the final stages of compilation and when proofs from the computer files are examined, thus ensuring the highest quality standards. A chart expresses an enormous volume of information in a deceptively concise way, and the elimination of any mistake is an onerous but essential task; the detail presented to the chart user must be accurate and reliable, since a chart is essentially a safety tool. Additionally, it is at this final stage that agreement with all other *Admiralty* publications (Sailing Directions, Radio Signals, List of Lights etc) is confirmed, thereby ensuring that the whole navigation package supplied by the UKHO is consistent and accurate. Only when this important process is complete and when the very latest information received has been assessed for inclusion can the chart be published.

Production & distribution

The computer files are sent to the print room for plate making and printing and to the Admiralty Raster Chart Service (ARCS) for production of the CD-ROM version. For paper charts four printing plates are made, one for each constituent colour of the chart. The plates are loaded onto a four-colour offset printing press and a stock of charts printed according to anticipated demand. Over 2×5 million sheets are printed each year, with every printing sampled to ensure that accuracy and quality has been maintained. The production process is completed by cutting, folding and labelling before delivery to the stock room.

The ARCS chart is produced from the same computer raster files as the paper chart, with a master CD-ROM being sent to a specialist producer for CD replication. Should an updating Notice to Mariners be issued affecting any chart held in stock then all copies of that chart are sent to the Chart Correcting Office to be hand-corrected. All charts held in stock are kept corrected so that they leave the office fully up to date. From the stock room, charts are despatched in bulk to a network of over 120 world-wide independent, accredited *Admiralty* Chart Agents. These main agents are required by their accreditation to update their stock of charts from any Notices to Mariners which are issued whilst the stock is in their hands. In addition, there are 70 non-correcting chart agents located throughout the British Isles.

Notices to Mariners

All *Admiralty* Charts are corrected by Notices to Mariners (NMs), which inform the user of safety-critical changes to charts as they occur: for example, alterations to depths or repositioning of buoys or lights. About 5200 NMs are now issued annually. They are available as a paper Weekly Edition, or can be downloaded from the UKHO website. The ARCS version is obtained on a weekly CD-ROM update that will automatically apply NMs to any ARCS chart being used. ARCS updates are cumulative - the latest update CD will display the latest version, whether previous updating CDs have been loaded or not - a great advantage over paper where falling behind with corrections simply makes the update task even more burdensome for the hard-pressed navigator.

The *Admiralty* Chart - the Future

ARCS was the first electronic chart series to be produced by a Hydrographic Office (1996). Its simplicity - it is effectively a facsimile of the paper chart - has made it popular with mariners who are prepared for an electronic revolution but baulk at the prospect of learning a new symbology or using unfamiliar chart presentation and layout. The series has almost world-wide coverage and its sales, though not rivalling paper, are nonetheless increasing by 50-60% annually.

The real revolution however is coming more slowly. Electronic Navigational Charts (ENCs) are vector charts, rather than raster, and display layers of navigational data which can be selected or removed from the screen (subject to some safeguards) at the discretion of the navigator. Since the data can be interrogated and the user can drill down for additional information on the chart features depicted, the symbology is inevitably different to facilitate the identification and layered examination of the items of data. Unlike paper charts or the ARCS series, ENCs are produced as cells of a seamless database, with no overlaps.

UKHO has begun to issue ENCs of UK home waters, but it will be a few years before full coverage is achieved. Other nations are making similar progress so ENCs are not yet commonplace on ship bridge systems. Even where ARCS is carried, a full and fully corrected paper back-up is still required by international law.

Some leading shipping companies, such as P&O, are however beginning to use ENCs, which must be used on a type-approved Electronic Chart Display and Information System (ECDIS). The navigator switches to ARCS for coverage of areas where no ENCs are yet available (the "dual-fuel" package being promoted by UKHO). Mariners who take the trouble to become familiar with ENC display are generally impressed and quickly become converts.

An ECDIS screen displaying an ENC (Electronic Navigational Chart).

The momentum of vector technology clearly presents the prospect of combining - and overlaying - navigational data and other relevant data, such as land mapping data, weather information, environmental information and a host of other possibilities. A partnership of data "warehouses" could supply bespoke products by configuring a combination of datasets to the user's specification.

Hydrographic Encyclopaedia

As a first and key step towards creating the possibility of such a hydrographic encyclopaedia, UKHO has begun to plan and build the integration of its current disparate databases, ranging across 200 maritime publications in addition to the master data for navigational charts. This Vision 2000 Flowline Project (V2F) is based around the integration and rationalisation of the production processes and data required to generate existing and foreseeable products and services. The scope is from source receipt to digital product files ready for manufacture (printing, pressing CDs etc) and sale.

At the heart of the proposed system is a series of databases:

- a database to manage source data
- a database to manage the processed information that forms the raw material of all the products (the National Hydrographic Database or NHDB)
- a database to manage the information about those products (e.g. data content, geographical coverage, format etc.)
- a database to manage the finished products themselves, including historic versions.

Currently there are nearly as many production flow-lines in UKHO as there are product ranges. Data is duplicated across these various flowlines and is held in proprietary, product-specific and occasionally conflicting forms. For future needs, this is not conducive to UKHO's desire for flexibility and responsiveness.

The V2F concept is intended to provide the blue print for introducing **a core production process built around a master hydrographic database**, from which all UKHO information products and services will be output.

The NHDB will store, in vector form, all the real world data (i.e. descriptions of lights, wrecks, bathymetry etc) required to generate products. The data will be held once and each feature uniquely identified. And it will be held in a product-independent manner, in such a way that individual features can be combined in different ways and can be output in different formats as required for a product or service.

The result of this challenging programme will be nothing less than a new hydrographic data infrastructure, fit for the increasing demands being made upon it.

In the meantime, world-wide sales of the traditional paper Admiralty Chart continue to rise year after year. The expertise which produces them is still guarded and

nurtured in Taunton. Whatever revolution in delivery may occur, our chart compilation skills will remain at the heart of our reputation.

Although our most important customer is still the Royal Navy, NATO increasingly values UKHO expertise and scope, since our world series of charts is maintained, as an up-to-date global database, to a degree which far exceeds any other hydrographic repository.

At Taunton, we carefully preserve Captain James Cook's original surveys and drawings - part of a remarkable collection of documents acquired over 200 years of British exploration and discovery. Fortunately, the habit of acquiring and storing information has never left us and the result is an unrivalled database the full value of which is yet to be exploited.

Nigel Smith has worked at the UKHO for over 30 years. Trained as a Mapping and Charting Officer (MCO), he spent many years in chart compilation work, moving between a number of chart branches covering different regions of the world, as well as working on navigational publications and in specialised defence areas. He currently holds a management position on the team charged with preparing for the restructuring of the UKHO's data handling and production systems.

50 YEARS (ALMOST) IN MILITARY SURVEY

By Bob Payne

Continued from the spring 2001 edition.....

On Commissioning

September 1975 saw me posted to the School of Military Survey (SMS) again on commissioning, this time in the post of Assistant Instructor Air Survey (AI Air). At that time the three AIs were totally responsible for instructing the Army Survey Course in their respective departments during Part I of the course. As two courses started each year, with an overlap between three courses, life was hectic and there was little time for other activities. Life was good nonetheless, and one had the pleasure of meeting all the young officers at the beginning of their careers with Military Survey. Some of those have already retired themselves from very senior posts, Brigadier Andrew Hoon being just one. One must not forget the overseas officers from a great variety of technical backgrounds and abilities. All were a pleasure to work with and a number became good friends who still keep in touch. During that 5-year period I saw the rebuild of the School from start to finish. In 1976 Major General John Kelsey took the first ceremonial swipe at the building containing the old Pay Office, by demolishing one end with a JCB. After living and working in a sea of mud, the majority of us moved into our new purpose built buildings during the course of 1979. The Sergeants' Mess was the last major move, the old buildings being in use for some months. It was rather odd looking out of my new first floor office down on the old Mess, located in the dip that is now the Group HQ car park.

That period saw a rapid increase in the introduction of computers - was it really only that long ago that we thought the HP 9810 was the bees knees, and we were happily programming in machine code? We got an initial and promising taste of things to come by connecting a Wild EK5 to one of the B8s. So promising that we soon progressed to fitting EK8s to all B8s equipped with encoders. The EK5 was given to the Royal Military College of Science (RMCS) where the new photogrammetry upstart, one Bill Barnes, soon had it fitted to his old Wild A5. So continued the close support and liaison between RMCS and SMS, and the start of a long personal friendship with Bill until his untimely death.

The Training Adjutant

September 1980 saw retirement from my military career, only for my return to SMS as the RO3 Training Adjutant in October 1982. No doubt there were those who wondered what on earth they had done to deserve that, but from my point of view, it was a good move. I lived less than 3 miles from the School, I lived north of Newbury, as is the School, so had no travel problems (no bypass then), and I was back in an environment that I loved and with the officers and soldiers I had known for many years. But what does one say about a job that lasted for more than 18 years?, probably becoming the longest serving RO and one of the longest serving ROs2 (promoted in post in 1990). Many would think that it could have been very boring, but nothing could be further from the truth.

I mentioned earlier the pleasures of seeing all the young officers starting out on their careers during my time as an AI. As the Training Adjutant I saw some of those back as my boss in the chair as Chief Instructor. My first was Mike Nolan followed by John Dean, who was AI Field when I was AI Air, then Mike Shellswell, Jonathon Forbes, Nick Fickling, Ian Ross, James Prain, and finally Angus Cross. I had seen all the last five as students! All were very different in the approach to their task, but all were very much the same in their determination to ensure that the School retained its reputation within the survey academic world as a centre of excellence. One other thing common to all was that I was permitted to get on with my work with the minimum of interference, something for which I was truly grateful.

Milestones

What were the milestones of those 18 years?

- The incredible amount of work that went into setting up the Map Reading Instructors Course in 1982/83, even more in demand now and stronger than ever.

- The demise of 42 Survey Engineer Regiment and its absorption with SMS into 42 Survey Engineer Group with Colonel Roy Wood as its first Commander. The initial moves to shoehorn the Group into Denison Barracks started in late 1984, with the main group of Regimental personnel joining in 1985.

- The appointment of a Principal Lecturer, John Knight, the senior academic in the School with special responsibility for development of the Army Survey Course. He has seen that course attain its rightful status as the MSc in Defence Geographic Information underwritten by Cranfield University.

- Not one - but two complete Survey Employment Reviews as we struggled to keep pace with the rapid developments in technology and its effect on how we go about doing our business. The most far-reaching result being the cessation of base plant production working and a return to a fully mobile concept.

- The introduction of GPS, cost effective

analytical photogrammetry and digital cartography. These have seen the demise of the traditional Field Surveyor, the Air Surveyor and the Draughtsman, but they all live on to one extent or another as computer drivers in the new employments of RE Geographic Data Technician and RE Geographic Analyst. The Printers and Photographers were not to be outdone and have re-invented themselves as the RE Geographic Production Technician, joining the analytical revolution with digital pre-press.

- The highest recognition of that 'Centre of Excellence' when Her Majesty graciously bestowed the Royal Accolade on the School which now proudly bears the title "The Royal School of Military Survey".

- The Military Survey Agency coming together with the Joint Air Reconnaissance Intelligence Centre on the 1st of April 2000, to form the Defence Geographic Imagery and Intelligence Agency under its first Chief Executive, Brigadier Peter Walker. Things cannot stand still and change is inevitable, but of some regret to old stagers like me is that the term Military Survey lives on only in the title RSMS and the recently formed Military Survey branch of the REA.

Finally, my lasting impressions will be of the extremely high calibre soldiers and officers it has been my privilege to serve with and to call 'friend'. Also all those overseas officers who have given me great joy, great despair and, occasionally, sheer frustration - but never a dull moment!

DSA VISIT TO CHICKSANDS

By Major General Eric Barton

Following our recently acquired reputation for holding visits during the most atrocious weather conditions, it was a pleasant surprise to find the 8th of April beginning in glorious sunshine for our journey into the Bedfordshire countryside to visit the Defence Intelligence and Security Centre (DISC) at Chicksands and the 12th Century Priory Mess.

This visit had been arranged for a limited number (20) of DSA members by Wing Commander (Retired) Mike Mockford OBE RAF, the Secretary of The Medmenham Club, our associated organisation. Mike met and welcomed the visitors in the Chicksands Officers Mess, which is a wonderful 12th Century Priory and made a very pleasant setting to commence our tour. He gave a brief talk on the work of the tri-service and civilian DISC and told us that, on normal working days, the well-maintained grounds that were landscaped by Lancelot "Capability" Brown, would be teeming with every uniform from all services, as well as many civilian instructors, operators and students.

After a brief, American style, Sunday 'brunch' in the Mess, the party walked through the grounds to the Intelligence Corps Museum where we met the Assistant Curator, Kathy Lamb. The Museum houses many fascinating accounts of intelligence activities during the Cold War and of wider geographic areas and an impressive collection of medals and uniforms together with accounts of many of the members of the Intelligence Corps. Needless to say, the "Enigma" equipment, already familiar to DSA members who had previously visited Bletchley Park, drew much attention.

A nearby building held the Medmenham Collection, featuring the work of photographic reconnaissance and interpretation, with all the associated skills from planning, flying, photography, measuring and dissemination. Displays of equipment and photography brought the inevitable cries of "I remember using those..." as well as the game of spotting places you once knew. Altogether a very fine collection assembled by undoubted enthusiasts, but limited by continuing considerations of security and of the limited space in which it is housed and displayed.

Following these visits, the party walked back to the Priory Mess where we were given an excellent talk by Roger Ward, a very knowledgeable gentleman from the 'Friends of the Priory' - a charitable organisation which is a spin-off from the local historical and archeological association. His comprehensive briefing covered the entire history of this ancient property and grounds which stretches back to the Doomsday Book. The Priory itself has an intriguing past, from religious house to private dwelling. Stories of hidden tunnels and nuns walled up in the building were told with suitable serious expression by our enthusiastic and well-informed guide! One could really believe that there are only a handful of living-in members in the mess because of the ghost in some areas - or is it a visitor from SPECTRE ??

In summary, a delightful and a very entertaining visit, confirming the value of our newly formed association with the Medmenham Club. Our very special thanks must go to Mike Mockford for arranging this day and also to the curator and staff of the Museum and Priory respectively.

Major General Eric Barton

THE MEDMENHAM CLUB

By Wing Commander (Retired) Mike Mockford OBE RAF

Secretary of The Medmenham Club

As many of the DSA members and also those of the Medmenham Club have spent a career involved with aerial or overhead imagery in its various form, it is, I believe, true to say that there is a close affinity between the two organisations. Reflecting this affinity, our respective Presidents, General Eric Barton and Air Commodore Ted Williams agreed last year to a closer, but informal, association between the DSA and the Medmenham Club. Since then there has been some very enjoyable social "cross-fertilisation", which we hope will grow over the coming years.

In order to encourage closer, but informal links, we have very kindly been offered this opportunity to provide a little background on the Medmenham Club and its aims. Perhaps at this stage, an apology should be offered to those who belong to both the DSA and the Medmenham Club who will have a feeling of de ja vu as they progress.

The Medmenham Club was established in 1946 to maintain the camaraderie enjoyed by the photographic interpreters who served in the Allied Central Interpretation Unit (ACIU) at RAF Medmenham during the Second World War. Membership was, however, extended to those Photographic Interpreters (PIs) who served in the many overseas locations (North Africa, Italy, India, Burma, The Far East etc). The Club's first President was the late Dr Hamshaw Thomas who pioneered aerial photographic interpretation in Palestine in 1916 and later served at Medmenham. Dr (Wing Commander) "Ham" Hamshaw Thomas is considered by the faithful to be the "Father of PI" as he established the working principles of military photographic interpretation during the First World War and introduced the procedures that are largely still followed today. His "daytime" job was as a Botanist at Cambridge University!

Second World War experience is, sadly, now limited to a few senior members. However, membership has been widened since the early days, and many "younger" members have practised photographic interpretation in operational theatres throughout the world and been involved in most world crises from the 1950s through to the 1980s. Now, in the year 2001, some of our truly younger members have gained experience serving in support of current operations in Europe and the Middle East. Thus we could be said to form a unique association of former and serving photographic interpreters and imagery analysts (IAs) spanning every world event of significance from the Second World War to the present. Sarah Oliver (nee Churchill), Lady Charlotte Bonham-Carter, and Art Lundahl (of Cuban Missile Crisis fame) were all members. We await recognition for some of our younger members!

Membership of the Club is open to all serving and retired photographic interpreters and imagery analysts including officers, warrant officers and senior non?commissioned officers from all branches of the Armed Services, the Voluntary Reserve and equivalent Intelligence Officer grades in the Civil Service. Associate membership is also open to those who have worked in a supporting role or had a close working association with the PI profession. Club membership stands at approximately 250 active members.

The main aim of the Club is to keep former and serving PIs (IAs) in touch. We try and achieve this through a very informal, but we hope informative, biannual newsletter. The Club also holds an annual reunion; typically on the first or second Saturday in June, usually at a place of current PI activity or, alternatively, nostalgia - and a Spring and Autumn lunch in London. Members, partners (to use a modern term) and friends are all welcome to attend Club functions.

The Club sponsors the Medmenham Trophy, which is awarded annually to a practising imagery analyst, either Service or civilian, who is judged by a panel of senior officers from the MOD to have made the most outstanding contribution to military imagery intelligence during the previous year. Exigencies of the Service allowing, the award is usually made at the Annual Reunion.

Club members have also contributed material and experience to the ever-growing Medmenham Collection (PI Museum) that has been developed under the guidance of OC The Joint School of Photographic Interpretation (JSPI), located at the Defence Intelligence and Security Centre (DISC), Chicksands.

If DSA members would like to join us at any of our functions, they will be made very welcome. Lunch dates are: 15 Nov 01, 25 Apr 02 and 21 Nov 02. We hope to hold the Annual Reunion at the DISC Chicksands on 8 June 2002 and anticipate including a visit to JSPI and to the updated and expanded Medmenham Collection.

FIREPOWER, the Royal Artillery Experience

By Robert Dobbie

The Association has supported the creation of the RA Museum over the past 10 years and has provided both money and equipment for exhibits. The museum was opened to the public on the 27th of May 2001 - the first time for over 250 years that the public have been given access to the historic site of the Royal Arsenal, where 80,000 munitions workers were employed during the Great War. After the DSA AGM on the 16th of June about fifty of us visited the museum.

Our visit started with a short film in the Breech Cinema which opened with some young people playing football at Hyde Park Corner. When they come to the Royal Artillery memorial, one of them says that it is a war memorial to the Gunners. The others say that they did not know that their football team had a war memorial! What the sombre memorial does is to spark realisation in them and provide a tangible connection between today's young people and the ethos and traditions of the Royal Regiment of Artillery. This is the dual purpose of the exhibition - to provide an informative museum for the public and a place where recruits into the Regiment can begin to understand the ethos and traditions of which they must become proud inheritors.

The 'Field of Fire' multi-media presentation uses archive film on four screens, a stirring soundtrack, lots of noise, smoke and a shaking floor to give the idea of being a gunner in action. Various pieces of equipment feature from a 2-pounder anti-tank gun in the Western Desert to the Honest John nuclear rocket and an Auster air-observation aircraft hanging overhead.

After that we were free to wander round the well laid out Gunnery Hall and the Real Weapons Gallery with lots of hands-on exhibits. Bill Taylor spotted a battledress blouse with full serjeants stripes and the 'S' in a wreath indicating a First Class Survey Technician. Judging by the medals, which included a Burma Star, the owner was probably in the 2nd Survey Regiment. It would be interesting to trace the soldier who donated the uniform.

Upstairs there is the History Gallery with the story of gunpowder and the first guns used on the battlefield at Crecy in 1346, various instruments and good explanations of well known gunner terms such as Congreve, Shrapnel and Boxer. The Medals Gallery is pleasantly quiet with its extraordinary collection of the symbols of individual bravery such as the four MCs won by Lt Wallington in the Great War.

Of course there is a good little café for those who like to sit and chat with comrades over tea and cake as well as a well-stocked gift shop.

The RA Museum is just part of a much bigger project which continues as funds become available. A Monster Bits Gallery is under construction for the big armoured self-propelled guns and the Chevrolet Quad, which 1940's gunners will remember, towing the 25-pounder and its limber. Much is also being done behind the scenes combining historical research and conservation activities to preserve objects and extend our knowledge.

In the next building is the James Clavell Library which contains some 25,000 books on military history as well as scientific and technical works on the subject of artillery, biographies of military figures and related material. This is not open to the general public, but researchers who need direct access to material can apply in writing to the Historical Secretary at the Museum.

The Defence Surveyors' Association is very proud of its association with this project and I would encourage everyone to take a group to see what is a very excellent and well presented collection which will appeal to the young. The tone is not militaristic, but gives a great feel for the ethos of a fine regiment and the traditions of the British army. There is plenty to see and do.

My wife and I stayed late at the museum, and then walked down to the old octagonal guardrooms from where there is a good view across the river. We also saw Tower House with the old workshop (The Shop) where the Royal Military Academy was first set up in 1721. I thought of my great-grandfather, Captain Charles Orde Brown, who served as a gunner in the Crimea and lived on Shooter's Hill at the beginning of the last century. We drove home using the free Woolwich ferry to cross the Thames. It all made for a great day out full of interesting objects and pleasant memories enjoyed with good comrades. Many thanks to our Secretary, David Wallis, for organising such a memorable event.

Robert Dobbie was commissioned into the Royal Engineers in 1961 and joined 41 Army Survey Course in 1968. He enjoyed overseas postings in Cyprus, Malawi, Guyana, the Middle East and Hong Kong before transferring to the Scientific Civil Service in 1979 to work on computer systems for Military Survey. However, he kept his links with uniformed life by service with 135 Field Survey Squadron RE (V) which he ultimately commanded. He took early retirement in 1995 and is now a Director of GEO-UK Ltd - specialist publishers of the twice-weekly Geospatial and Property Bulletins. Robert is the DSA Treasurer and webmaster.

DSA 'Battlefields of Europe' Tour: Ypres-Mons-Waterloo

By David Wallis

On the 8th of October ten members, including their ladies and guests, departed on a five-day "Battlefields of Europe" tour organised by Leger Holidays.

It proved very convenient, as the tour company was able to organise pick-up points around the country and transfer passengers to their correct tour coach at Folkestone, just before the crossing via Euro Tunnel. The choice of Channel crossing method was fortuitous as on the day of departure the Channel was very rough indeed. However the rest of the week was excellent, a real "Indian Summer"

The party was most fortunate in having Bill McQuade as their guide, Bill being a first-class battlefields guide who possesses in-depth knowledge of the strategy of many European battles. This enables him to describe actions from the point of view of both opposing sides and therefore he is able to bring a great deal of reality to the scenario where each battle took place.

The first full day covered the Ypres Salient and the conflict that took place there from 1914 lasting on and off for almost the whole period of the First World War. The party visited places like Sanctuary Wood, Hill 60, Langemarck and Hell Fire Corner, that have gone down in history as the "Killing Fields of Europe".

The second day was devoted to the Battle of Waterloo, where the last great battle took place between armies bedecked in the colourful uniforms of their respective regiments. The battle lasted only three days, mostly consisting of close combat fighting. The expert knowledge of Bill McQuaide made the conflict come alive, so that one could almost see and hear our Cavalry charging down to engage the enemy, and the checker-board layout of the British "Squares" fending off the counter charge by the French Cavalry,

The penultimate day was spent in the area of the Battle of the Somme where over 150,000 British solders died in a matter of five months, commencing on the 1st July 1916. This battle involved every regiment of the British Army. Places visited included Albert, Lochnagar Crater, Delville Wood and Beaumont-Hamel and the very moving Newfoundland Park which commemorates the valour of the brave men from that small country across the Atlantic, only a handful returning home after 1918.

The morning of the last day of the tour was spent looking around the preserved battle area of Vimy Ridge and the magnificent and breathtaking memorial to the gallant Canadians who fell taking this heavily fortified German position. The memorial contains the name of 11,000 Canadian solders that have no known grave.

It is hoped that Bill McQuade will be able to organise a trip in 2002 to take in the "Atlantic Wall" that ran along the French coast. This would be an event not to miss; we will keep you informed.

David Wallis

VISIT to the ROYAL ARMOURIES, FORT NELSON

SATURDAY 16th MARCH 2002

This event is likely to be one of the highlights of 2002. Fort Nelson, situated above Portsmouth and its surrounding area, with breathtaking views over the Solent and the Isle of Wight, is only part of this most awe-inspiring location.

The visit will commence with a reception followed by the live firing of one of the Museum's artillery pieces at precisely 13.00hrs. This will be followed in turn by a three-course lunch with wine and coffee, which will be served in the Fort's private Mess Hall. After lunch an actor will tell us what life was like as a Field Artillery Officer on the Front Line in the First World War.

There will then be a guided tour of the Royal Armouries collection, and a chance to look around some of the 19 acres which comprises the complex and magnificent Victorian fortification called Fort Nelson.

The cost of this event is an unbelievable £ 14.00, the only possible extra being the cash bar reception.

Please book through the Secretary, David A. Wallis, 161 Cooden Drive, Bexhill-on-Sea, East Sussex TN39 3AQ

TAVISTOCK

By Rear Admiral GS Ritchie CB, DSC, FRICS

Ferdinant Hassler, sent to London in 1811 to purchase instruments for the newly formed US Coast Survey, took up residence next door to the eminent instrument maker Edward Troughton "At the Sign of the Orrery" in Fleet Street. Edward's business continued to prosper for two hundred years, manufacturing all manner of astronomical observing devices, including theodolites and sextants.

In 1826 Edward Troughton took William Simms into partnership, trading as "Troughton & Simms" even after Edward's death in 1835. Three active generations of Simms' carried on the business until 1922, when Thomas Cooke and Sons bought out the Simms family and the manufacture of instruments was moved from the Simms factory at Woolwich to Cooke's at York. The name of the firm now became Cooke, Troughton and Simms, which in the 1930 developed an innovative theodolite named "The Tavistock".

The renowned Tavistock theodolite.

In the 1930s HMS *Herald* was employed surveying the coasts of Malaya, Sarawak and North Borneo, each survey requiring considerable triangulation work ashore before sounding could begin. As the junior surveying assistant onboard *Herald* in 1936-37 I was burdened with the cumbersome Watts theodolite as I climbed though the jungle to the triangulation stations, whilst the more senior assistants enjoyed using our two new Tavistock theodolites. These, each weighing 22 lb. in their metal cases with web-rucksack straps, fitted comfortably on the surveyor's back, or perhaps even more comfortably on the accompanying surveying recorder's back.

Instructions for dealing with the older theodolites, such as mine, ran to some seven pages in the current Hydrographic Surveying Manual by Wharton and Field. The text began: "The less a theodolite is tampered with by unpractised hands the better, but they must be adjusted from time to time, and little things are constantly wanting attention." These 'little things' included replacing broken crosswires in the telescope with cobwebs which a garden spider had been persuaded to weave across a two inch square gap in a sheet of cardboard. Such theodolites required a reading to be taken from both sides of the horizontal circle, requiring the observer to move around the theodolite, putting at risk the level of the instrument.

In 1921 Heinrich Wild in Switzerland had begun marketing a new lightweight theodolite fabricated by Zeiss. By using an internal optical system readings from opposite sides of the circles were presented at a single eyepiece, where they were aligned and moved by a single screw micrometer.

Alarmed by this new introduction, Military, Colonial and civilian surveyors held a meeting at the Imperial College of Science and Technology in London in 1926 to discuss improvements that could be made to British theodolites. It was decided to arrange a practical conference in the West Country.

The South African columnist Colonel Spring in his 'Jottings' column in the "Empire Survey Review" described in his light-hearted style the activities in Devon: "Instrument-makers whose names are household words; the "Mother of Surveys" at Southampton; the Hydrographers in their splendid Admiralty fastness; born observers; well known designers, in fact the theodolite world - all received strange invitations to foregather at the town of Tavistock close to Dartmoor, bringing fresh minds and old instruments with them. The Soldier Surveyor and some of his staff brought new and singularly clever models to the feast."

Every morning and afternoon theodolites by the score sat on neighbouring hills. The party, by two's and three's, strolled and climbed and squinted down telescopes and pondered and read readings and grew slowly to conviction. That rugged plateau - those ancient tors - were crowned by interested and thoughtful men; and so home, in the evening to bath and sundowner. Washed and changed, the party, appetites sharpened by fresh wind and pleasant company, did itself pretty well at dinner, and thereafter, refusing the second cup of coffee, gathered round a long table and struggled with the ideal theodolite specification.

And what of all the labour and thought and cost which went to such a first model as we got finally in 1930? It was Cooke, Troughton and Simms who breasted the tape with their "Tavistock".

In the Tavistock the arrangements for reading the circles were completely novel. The images of the two diametrically opposed circle graduations were brought by optical means to either side of a broad reference mark as seen through the eyepieces close alongside the telescope eyepiece. The act of symmetrically straddling the two graduation lines either side of the reference mark, using the appropriate micrometer head, enabled the circle to be accurately read.

The optical applications of exactly pointing the telescope on target and the precise centring of the reference mark are major contributing factors governing the accuracy of the Tavistock. Exhaustive tests carried out at York by several competent observers using a collimator target gave an average mean difference between observations of about 3½ seconds. Wild were claiming 2½ seconds with their latest theodolite; nevertheless the Tavistock was widely chosen by military and land surveyors worldwide, and we hydrographers found it to be an incomparable tool and a joy to use.

First published in 'Hydro International'.

Rear Admiral GS Ritchie CB, DSC, FRICS

Admiral Steve Ritchie first joined the RN Surveying Service in 1936. He served with the 8th Army in North Africa, Italy and Sicily and was then First Lieutenant in HMS Scott from D-Day at Arromanches until VE Day.

During his career, Steve Ritchie commanded four of HM Survey Ships and rose to be Hydrographer of the Navy from 1966 until 1971. He served as President of the Directing Committee of the International Hydrographic Bureau 1972-1982 and is a long-standing member of the DSA.

DEFENCE SURVEYORS' ASSOCIATION

ANNUAL PRIZES

The DSA provides an annual prize to a member of each of the following:

- Royal Navy Hydrographic Service
- Royal Artillery surveying and locating units
- Defence Geographic and Imagery Intelligence Agency

The prizes are open to all personnel serving in the organisation and are awarded to those who, in the opinion of the DSA Council, have made a significant contribution to the advancement of the technology associated with the acquisition, exploitation, dissemination and management of spatial data for UK defence forces.

Each prize will consist of a cheque for £150 and an award certificate.

The criteria for submissions for the DSA Prize are outlined as follows:

- Person or persons put forward for consideration must have made a significant contribution to a technical concept or operation that has been successfully adopted or integrated into a military application within their Unit, Branch or Service.
- Consideration will also be given to a nominee of any rank who has made a significant contribution which has enhanced the geomatic profile of the Defence Geographic Community.
- Each nomination must be countersigned by the nominee's Commanding Officer.
- There will only be one prize winner from each of the three surveying related Services.

Submissions are now requested for the prizes for the year 2001

For further details contact the DSA secretary:

David A Wallis
e-mail: secretary@defencesurveyorsassociation.org

KITCHENER - THE SURVEYOR

To most people today, HH Kitchener is no more than a face on a famous poster whilst to a few, who judge historical events by today's standards, he is the man who invented the concentration camp. In reality he was a man of many parts who, in defeating the Dervishes at Omdurman, destroyed the Taliban of the day. What is not generally known is that he was an accomplished surveyor long before he emerged into the national limelight during the unsuccessful attempt to rescue Gordon, another Sapper surveyor, from Khartoum.

The following article taken from an 1870's edition of Sapper magazine, recounts an incident during Kitchener's early career when working as a surveyor in Palestine. It illustrates not only the type of man that he was but also the hazards that have always been a possibility for survey parties in the field. His second survey post was as the Director of the Survey of Cyprus from 1879 to 1882.

SURVEY OF PALESTINE

The following account of the work of the Palestine Survey now being executed under the supervision of Lieutenants Conder and H Kitchener will be of interest to our readers.

It being found that the state of the East and the health of the survey party, rendered it prudent to suspend the field work for a time, a staff of five NCO's under the direction of the above named officers, has been assigned for the preparation for publication of the work already done.

The calculations of the trigonometrical work are being worked out at Southampton, and the points are laid down by their co-ordinates on new sheets of 22' of longitude by 15' of latitude, to the scale of one inch to the mile and to Sir Henry James' projection.

The total number of these will be 26, and 21 of these have been surveyed (about 5000sq.m) leaving some 1200sq.m in Upper Galilee to be surveyed or about six month's work.

Separate sheets will be prepared for the hill shading.

The detail shown consists of villages, towns, mines, rivers, springs, roads, cultivation and in fact everything that can be shown to the scale. The nomenclature is almost exclusively Arabic in English transliteration. The triangles are about five to ten miles a side and the number of vertical angles taken from each trigonometrical station will give the heights of about 125 points so used.

Some 4000 or 5000 aneroid readings were taken which will be worked out and corrected by the levels obtained from the trigonometrical stations. A certain number of these will be placed on the maps. Levels were also run between the Mediterranean and the Sea of Galilee.

The method of publication has not yet been determined but the idea is to make this a standard work for all interested in Palestine Geography.

The map is to be accompanied by a memoir which is to be made in sections containing the minutest information possible as to the Geography, Archaeology and Ethnology of each sheet, also a complete alphabetic name list in Arabic characters, and transliterated into English, with the meaning of each name and its Hebrew or Arabic derivation. This is a work of time and difficulty and is undertaken by Lieutenant Conder. It is impossible to say at present how or when it will be published. It will be accompanied by some 300 or 400 plates, plans, sections, special surveys and sketches.

The following is a short account of the Safed affair which for some time jeopardised the safety of the small survey party.

The fray originated in the insolence of a Sheik who came down to the tents and picked a quarrel with the head native servant. Hearing his oaths Lieutenant Conder looked out and perceived an oriental in white robes with a gold turban, throwing stones at the dragoman. Lieutenant Conder advanced meaning to attempt a pacification, for the Sheik was evidently a man of importance (and a cousin of the famous Abd-el-Kader, as it turned out afterwards) but he had quite lost his head and turned on Lieutenant Conder seizing him by the throat. The matter was thus taken out of his hands for not only was it a natural impulse to resist, but he felt that his prestige with all natives would have been gone for ever if he had accepted the insult. The Sheik had recourse to his knife but Lieutenant Conder succeeded in dispossessing him of that weapon and struck him in the face. The whole party had now got the alarm and Lieutenant Kitchener rushed to assist, but the mob collected in a surprisingly short time and soon the party

A rare photograph of a "relaxed" Kitchener in Palestine

were in the midst of a perfect hailstorm of stones, which lay quite convenient on every side.

The NCO's behaved with coolness and the little detachment of Maronites all remained staunch, though the survey party numbered but 15 in all, against some 300 fanatics armed for the most part. The stand made was sufficient to save the tents, animals, and valuable results from destruction but were it not for the arrival of Turkish troops which had been sent for at the beginning of the row, nothing could have prevented the murdering of the party.

The survey detachment was well armed but so were the mob, and it was clearly seen that the only course was to hold the ground by "passive resistance" until government assistance could be procured. The fanaticism which caused the first quarrel was already working the crowd into a fury, and the old fanatic cries which were heard in the Damascus massacre, were now raised. To have fired would just have given the excuse for a murder; as it was, the crowd were only waiting for a leader.

Thus whilst Lieutenants Conder and Kitchener endeavoured to keep back and pacify the mob, the sergeants kept disarming the natives who were quite beside themselves with rage. Many incidents in this long half-hour were extremely amusing - Sergeant Armstrong at the charge with legs of the camera obscura, and Lieutenant Kitchener dodging the enormous stones (not unfortunately with perfect success). As it fell out the assistance came none too soon. Lieutenant Conder was knocked down and partially stunned by a club and would have been done for but for Lieutenant Kitchener's assistance.

To avoid the danger of being surrounded the party now ran under cover. Three shots were fired one going close to Lieutenant Kitcheners' head.

The troops had arrived opportunely, and the various murderous weapons, clubs, guns, swords, hatchets etc., were stowed under the cloaks of the assailants who assumed the aspect of interested spectators.

Next day the detachment marched to the coast in order to open legal proceedings and telegraph home. Here the party was quite broken up. Lieutenants Conder and Kitchener stayed behind to attend the trial, and had the satisfaction of seeing the Sheik, who had been the aggressor, brought prisoner before the commissions appointed to conduct an enquiry.

The cause of this unpleasant affair may be said to have been oriental fanaticism. It had shown itself on many previous occasions but with no serious result. In this instance the rank of the offended Sheik and the large number of the mob who naturally sided with him, gave a more favourable opportunity for its exhibition.

First published in Sapper in the late 19th Century

FLASH SPOTTERS AND SOUND RANGERS

How they lived, worked and fought in the Great War

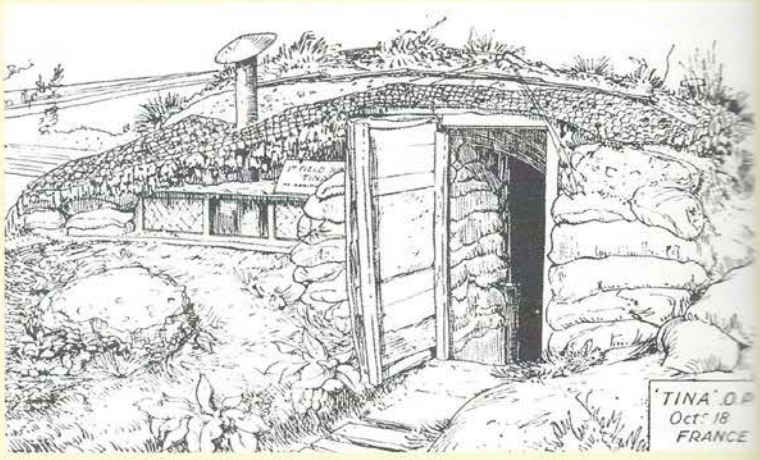
By John R Innes

This book is an absolute must for every Sapper and Gunner Surveyor for it tells, in 'first hand' words, the story of our predecessors who served in the mud and terror of the Western Front.

The book is in two parts, the first recounts the development of survey support for the artillery from the small handful of Sapper surveyors in 1914 to the over 6,000 serving by the time of the Armistice in 1918. In easy to read language, the book explains the first uses of scientific methods to locate the position of enemy guns and the growing complexity of the systems until sound ranging reached the point where it could differentiate between the various types of gun used to bombard the trenches.

However, it is the second part that makes the most gripping reading as this is a collection of descriptions, written only a few years after the event, by Flash Spotters and Sound Rangers of all ranks telling the story of their everyday life in the trenches.

The book was reprinted in 1997 by Mike Nolan. Copies can be ordered from Mike on 01635 253 167



The observation post named 'Tina'.
One of the superb line drawings that illustrate the book.

OBITUARIES

BRIGADIER LJ HARRIS CBE
Born 19 December 1910, died 24 January 2001, aged 90

Lewis Harris was an influential and visionary surveyor, a distinguished cartographer who participated in the planning that led to the decision to move the School of Military Survey to Hermitage. Later, with the Americans with whom he had established a close wartime liaison, he was involved with development of the Global Positioning System.

Lewis (Lew) John Harris was brought up in Wales and went to school at Christ College, Brecon. He excelled there both academically and as a sportsman. Unsurprisingly rugby, at which he eventually played for the Army and was a reserve for Wales, became an important part of his life; he became secretary of the Army Rugby Union and later its chairman and honorary vice president. But he was also an active cricketer being a member of a number of clubs such as Free Foresters and I Zingari, and a hockey player. In his capacity as captain of Corps cricket during the immediate post-war years he did a great deal to recreate the Corps side and revive the Sapper/Gunner match at Lords. Sadly the Lords venue for this match was not to last in spite of his efforts.

Commissioned in 1930 from the Shop, Lewis Harris completed his course including two years at Pembroke College, Cambridge, and in 1933 he joined 1 Field Squadron in Aldershot. They were still mounted on horses. Two years with the Training Battalion at Chatham then followed before he began his survey career by joining the team undertaking the geodetic triangulation of Jamaica, which he eventually took over as OC.

Returning to the UK on the outbreak of the Second World War, Harris went to France in command of the mobile echelon of 19 Army Field Survey Company, responsible for artillery and road and bridge classification surveys. He was Mentioned in Despatches for this work. Having escaped through Dunkirk, after a brief sojourn in Northern Ireland, he went to Edinburgh to raise and train 518 Field Survey Company. He was the only regular officer in the Company. He had a demanding task to train his officers, his 2IC being a colonial surveyor from New Zealand and his subalterns straight from university. To young officers he appeared to be a rather remote figure and a hard disciplinarian, but he soon moulded both officers and men into a fine team, which subsequently became known as the "Fighting 518". Surveys were carried out all over Scotland, including orientations for the early radar stations at anti-aircraft sites around Edinburgh and Glasgow. In due course, in 1942, the unit set off to join the First Army for the invasion of North Africa. In Tunisia one of the topographical sections was detached to an artillery unit of II US Corps, which had lost its survey element in the critical days following Rommel's counter-attack at Kasserine. Harris recalled how, while visiting his section, he found General Fredenhall, who was later replaced by General Patton, in the one lighted tent with his ADC "...a tense four hours ... with periodic telephone messages arriving from General Alexander, who had become General Eisenhower's deputy about two days previously." Further association with the Americans was to follow with Harris' appointment as AD Survey in the fully integrated Allied Forces Headquarters, responsible for mapping for the invasions of Sicily and southern Italy, the Balkans area and Greece and, in due course for the invasion of southern France. For this event he was detached to the US Seventh Army. He then went to the Far East as AD Survey ALFSEA, returning the UK in 1946.

Work of a less operational kind now followed with successive appointments at the School of Military Survey (Chief Instructor), the War Office (AD Survey 1) and the first of his attachments to Ordnance Survey. The Chief Instructor tour was particularly influential as it marked the point at which Survey in the Corps became a full career following a long (one-year) course. Harris wrote the course himself, designed not only for Sapper officers but also for civilians and, later, overseas students.

Harris was then posted, on promotion, to GHQ MELF as Director of Survey dealing, among other matters, with geodetic and mapping operations in Iraq, Jordan, Cyprus and Kenya. The whole of the north of Iraq was mapped at 1/50,000 (as it happened the Chief of Staff of the Iraqi Army had been at the Shop with Lew Harris). The Sappers had to wear civilian clothes.

In 1955 Lew Harris returned to Ordnance Survey and on promotion to Brigadier, became Director of Map Production and Director of Field Surveys, the latter at Chessington. During this time he undertook the introduction of hill-shading to tourist maps. In 1961 he took up his final appointment in the Army, as Director of Military Survey at Feltham. It was a formative period not only because of the need to plan for the eventual withdrawal of overseas headquarters and the consequent reshaping of the structure of Military

Survey; but also because of the accelerating technological changes then occurring. There was already a close liaison with the United States but it was during Harris' time as Director that a new branch was added to the Directorate for coordinating the joint UK-US satellite geodesy and field and geodetic survey programmes. Harris' personal rapport with the Americans together with their high regard for his professional abilities stood the project in good stead.

Lew Harris retired from the Army in 1965. He had been appointed MBE in 1943, OBE in 1949 and CBE in 1961 but perhaps the most apt accolade for such a fine and committed career was his appointment as Honorary Colonel of 135 Survey Regiment, which he held until 1967. His Fellowships of the Royal Institution of Chartered Surveyors, the Royal Geographical Society and the Royal Astronomical Society reflected the professional nature of his career. That was backed by several honorary posts: Honorary Foreign Secretary to the Royal Geographic Society (1964-67), Chairman of the Royal Society's National Committee for Cartography (1961-67) and a founding member of the International Cartographic Association of which he was Vice President from 1958 to 1961.

In 1967, Lew Harris moved to Canada where for five years he was a full-time consultant to the Federal Surveys and Mapping Branch of Canada later continuing until 1985 on a contract basis. Of this time Dr George Zarzycki, formerly Director of the Topographical Survey Division of the Department of Energy, Mines and Resources of Canada writes "...My primary mandate was to introduce digital mapping, automated cartography and establish a digital topographic database for Canada. Brigadier Harris' pioneering and groundbreaking work at the department in the field was of immense value to me. I valued and enjoyed our many discussions about the basic concepts of digital databases, data banks, automated cartography, the roles of the provinces and the federal government in establishing a national digital topographic database for Canada and the influence of the information society on our mandate. Lew was an excellent person to bounce ideas off. His sharp intellect made every discussion, however controversial the subject matter may have been, very stimulating and fruitful. We all loved Lew Harris for his kindness, intellect and good humour." Another associate of the time, Professor James Linders, now of the University of Guelph, writes: "I worked with Lew on the automated cartography system in Ottawa for over ten years. He was truly a great friend and associate ... he played a key role in the early development of automated cartography in Canada ... he was able to combine his wealth of experience in cartography with his interest in cartographic automation to create a team to explore the deployment of computer technology for mapping. The team was successful in developing one of the very first and most successful automated cartography systems in the world ... Brigadier Harris will always be remembered for his enthusiasm and cautious insight o all who participated in this project".

Throughout his career Lew Harris had enjoyed a close relationship with America both professionally and socially. He continued this during his time in Canada and in 1975 he surprised and delighted his near relations by marrying Opal Nowicki of Knoxville Tennessee, the widow of a close survey friend since his days in North Africa. She survives him.

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MAJOR SIDNEY HELLINGS RE

It was with deep regret that we learned of the sudden death of Major Sidney Hellings RE, at his home in Findon, near Worthing, on the 19th April 2001.

Major Hellings had a distinguished career in Military Survey during his 22 years of army service. In 1939 he served with the BEF in France, escaped through Dunkirk and then moved with 19 Field Survey Company to Iceland in late 1940. Returning to England the following year he became OIC of the Topographical Section of a Survey Company engaged in the production of blocks of the 1/25,000 (Benson Series) maps of Normandy and landed there on D + 4 with the Invasion Forces, together with the same Topographical Section. He undertook various triangulation surveys to check local survey control and provide the Royal Artillery with additional survey control which, with the speeding-up of the advance, became more and more difficult to perform.

With the capture of Brussels he became OIC of one of three General Field Sections that were assembling in the Empain Map Store which had been used by the Germans for their planned invasion of UK. Major Hellings and his unit were then principally involved in the revision of German 1/25,000 maps and subsequently Sidney was awarded the Croix du Guerre.

On his return to England in 1946 he became Field Survey Instructor at the School of Military Survey and two years later was posted to Kenya as OC 1 Radar Air Survey Liaison Section RE. The unit was tasked to flight plan and carry out the acceptance testing of survey photography covering large swathes of Africa produced for the fledgling Directorate of Colonial Surveys, later Overseas Surveys.

Sidney returned to UK in 1952 to the Survey Production Centre where he stayed until his army retirement in 1960.

Later that year he took a post in Africa as a Provincial Surveyor in Nigeria and returned to UK in 1964 to join a BP Seismic Survey Company engaged in Oil and Gas Exploration in Scotland and West and South Coastal areas of England.

In 1974 he joined British Gas Headquarters for Land Management duties and finally retired in 1980 to his home in Sevenoaks.

He moved to "The Spinney" School Hill, Findon and in 1990 he unfortunately lost his wife Pam. He has spent the greater part of his time entertaining elderly persons in Retirement Homes and Hospitals, local village concert activities and WI functions, with his popular self-inventive "Musical Quiz" game.

A Bristolian by birth, an accomplished pianist in popular music and jazz, a Rugby player and enthusiast, an ex-chorister who, with others, was an original in the vocal group "The Five Microtones", a 1937/38 Bristol group of West Country entertainers featured by the BBC pre-war.

Sidney had been a member of the DSA Council and a regular attender of meetings until he was unable to travel. He led a very full life, was a great character and wit, a generous and faithful friend, who is sadly missed by all who knew him and especially by his children, Sue in Hove and Anthony in London.

Ray WF Welch
Major (Retired) RA

CHRISTIAN AE (TIM) O'BRIEN MA CBE FRAS FRGS

Christian (Arthur Edgar) O'Brien was born in 1914, in London, the son of an Irish father and a Danish mother. He was educated at Tiffin Boys' School, Kingston-on-Thames, and from there gained a scholarship to Cambridge University. He read Natural Sciences at Christ's College where he occupied Milton's rooms, and in 1936 joined the Anglo Iranian Oil Company (now British Petroleum) as an exploration geologist. He was sent to southern Persia, travelling there by train. It was during this early time in his career that he was accompanying his senior geologist, Victor Boileau, when Boileau discovered the remains of Tchoga Zambil, an ancient brick ziggurat near the town of Ahwaz.

At the start of the Second World War, Christian was on leave in England, and volunteered for the Royal Engineers where he trained in surveying, and saw service in England, Tunisia and Italy, reaching the rank of Major RE. He married twice: firstly Frances Peggy Curtis, with whom he had two children, and secondly Barbara Joy Shorey, elder daughter of Captain William (Pat) Kelly of Manchester.

After the war he returned to BP, working both in Iran and Kuwait. This was followed by several years in the London Office as a regional geologist with various sorties to the Canadian Rockies, the Australian outback and Papua, New Guinea, looking for oil.

In 1958, after marrying his second wife, Barbara Joy, he was promoted to management and was sent to Libya as Exploration Manager; Canada, in charge of a BP subsidiary company; Triad; and then to Iran, as Chairman of the Boards and General Managing Director of the Iranian Oil Operating Companies. Because of his work in Iran he received the Order of Taj from His Majesty, the late Shah, with whom he had occasional meetings. During these years, 1960-1970 "Tim" (as he has always been known to his friends and family) and Joy O'Brien travelled extensively, both on business and on holiday. It was whilst in Canada in the mid-1960s that they started reading about, and researching, ancient civilisations.

On his retirement Christian was honoured with the award of the CBE by Her Majesty, the Queen, for services to the Oil Industry.

Christian retired from BP in 1970 and the following year he and his wife went to the islands of the Azores for a two month stay to study any geological evidence of the existence of Atlantis that might still be found there. Many other working holidays followed: Mexico, Greece, Mauritius, the Seychelles, Egypt ... It was in the 1970s that the true operation of Wandlebury earthwork, near Cambridge, was discovered by him, including the loxodrome which joined Wandlebury with the Hatfield Forest, Essex earthwork. The Telegraph Sunday Magazine published a long article on this in March, 1978. Then, the centre of operations moved to Cornwall, where Christian surveyed the stone circles and cairns on Bodmin Moor, and reached startling conclusions which were published in the Megalithic Odyssey. There followed two more books, "The Genius of the Few" and "The Shining Ones".

He was a man of many parts; a Fellow of the Royal Geographical Society and of the Royal Astronomical Society, a member of the Defence Surveyors' Association, an amateur painter and actor, and a keen athlete well into his seventies. He rowed in Christ's Rugger boat during his time at college. He chose to become a geologist because he wanted to climb mountains but he could have done almost anything. Hence the inter-disciplinary ease he has displayed in these works. A clever, but humble, man who wore his knowledge lightly.

He died on 17th February 2001 aged 87 years.

J o'B